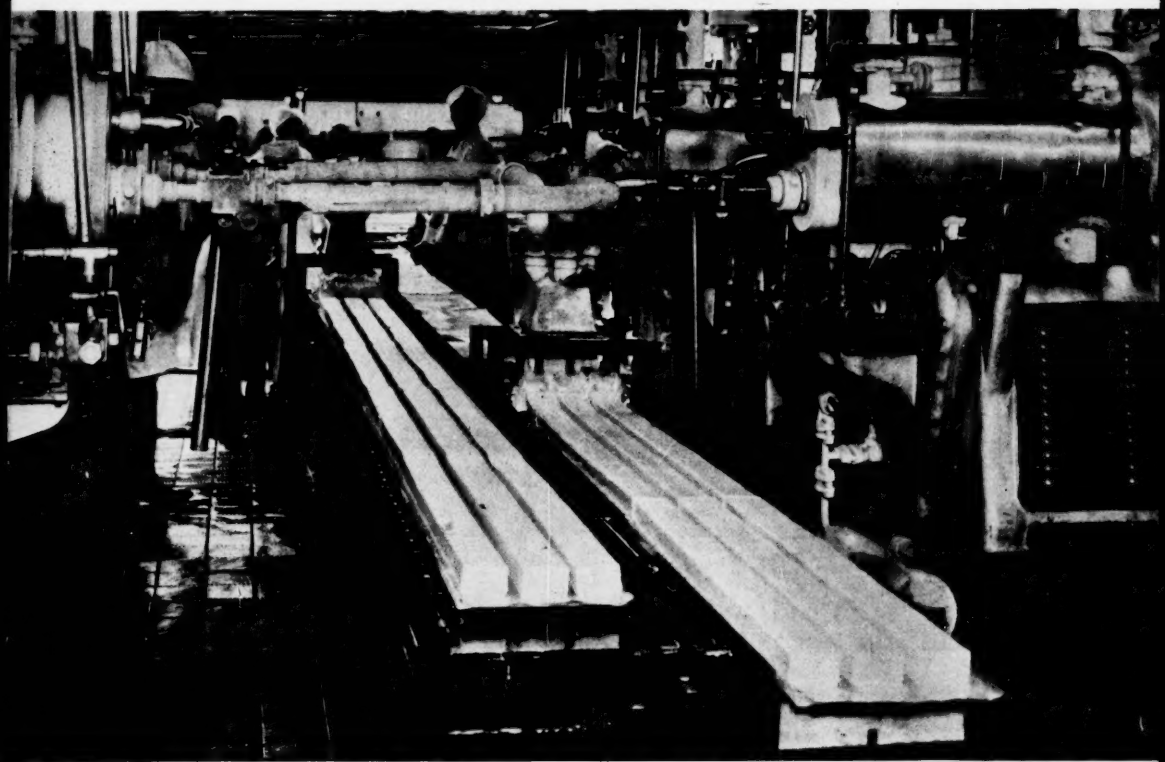
PACIFIC EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



Efficiency in England. Continuous ice cream freezers extrude slabs onto trays for hardening. (See story inside)

FEBRUARY, 1949: British methods, More spent for efficiency, Bottle washing improved, Electronic heat, Advanced engineering, Flowsheet, Report

REFINED LIQUID SUGAR TO BE AVAILABLE IN MORE AREAS; MANY ADVANTAGES OVER DRY, BAGGED SUGAR; BIG SAVINGS

Ion-Exchange Process Makes Possible Small-Scale Local Refineries

HIGH FREIGHT CHARGES AVOIDED

NEW YORK, February—Liquid sugar is becoming available in areas other than those located near the large sugar-refining centers. Liquid sugar is about ⅓ water and, while the seller only charges for the sugar, transportation charges must be paid on the water as well, thus limiting the sale of this very desirable product to relatively small areas close to production points. Because conventional refining methods require high capital investment and tremendous volume, to produce economically, there are only a few sugar refineries in the United States located in Boston, New York, Philadelphia, Baltimore, Savannah, New Orleans, San Francisco, and Sugarland, Texas. These vast plants cannot ship a liquid product more than a few hundred miles inland, and many of them do not produce liquid sugar at all. This has deprived large sections of the country of a cheap and easily handled product.

A new process developed by American Cyanamid Company, ion-exchange sugar refining, now makes liquid sugar available anywhere. Already, two plants are operating in Chicago and one in Milwaukee; one is being built in St. Louis; and others are in prospect. Ion-exchange liquid sugar plants produce economically at a fraction of the volume required by conventional refineries, and may be built for a fraction of the cost. By serving only a local community, freight on water becomes unimportant. It is expected that eventually the United States will be dotted with ion-exchange liquid sugar plants, bringing advantages in cost, cleanliness, and ease of handling to all industrial sugar users.

Liquid Sugar Reported Easier, More Sanitary, Cheaper To Handle

INDUSTRIAL USERS BENEFIT

NEW YORK, February—To switch from dry to liquid sugar, the only equipment expense involved for the user is the installation of storage tanks and piping—cost of which is reported more than offset by the elimination of these costly steps: unloading, storing, and opening of sugar bags, dumping sugar into kettles, dissolving it in hot water, and sometimes filtering it, and counting, bundling and returning the bags for credit. For example, one plant, which formerly used 350 bags of sugar per day, reported that a labor gang of *five men* was required for handling dry sugar. Only *one man* was needed when liquid sugar was adopted. Liquid sugar is also more sanitary, and helps keep the plant looking cleaner; it is handled in an entirely closed system. Whereas dry sugar has to be weighed in, liquid sugar can be metered in—easily and precisely—by the turn of a valve.

Cyanamid's ion-exchange process can produce from raw sugar a refined liquid sugar which is equal to refined white sugar dissolved in water, in color, odor and taste, and better in ash content. It can also produce less highly refined liquids, at a saving to the user. For example, if a slightly colored liquid is not objectionable, it can be produced for less than a water-white liquid; and, unlike colored liquids produced by conventional methods, it will not retain any molasses taste.

The versatility of the ion-exchange process has been amply demonstrated by its successful use in making various qualities of liquid sugar, from high-sucrose liquids to 100% invert, in concentrations ranging up to 75° Brix.

Western Food Industries

SECTION OF FOOD INDUSTRIES
Trends, Events, Developments

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FEBRUARY, 1949 • PACIFIC COAST EDITION FOOD INDUSTRIES • VOL. 21, NO. 2

Protective Measures Against Cattle Diseases Making Progress; Methods, Costs Cited

Livestock diseases, and the precautionary measures necessary to prevent their spread, were recently discussed by Dr. A. K. Carr, chief of the division of animal industry, Calif. Dept. of Agriculture. Many gains were cited.

First to fear is the hoof-and-mouth disease, especially since the 1946 outbreak in Mexico. History indicates, notes Dr. Carr, that each country having a neighbor in which the disease was established, has eventually become infected. Hence, regardless of cost, this disease must be stopped *in Mexico.*

Reporting on current efforts of the Mexican-American Joint Commission for control of this disease in Mexico, Dr. C. V. Duckworth, assistant director of Agriculture for California, says a "remarkable" job is being done. The Commission expects an early increase from present production of about 1,300,000 doses of vaccine per month to 3,000,000 doses per month. This is sufficient to vaccinate 3,000,000 large animals or a larger number of small ones. About 15,000,000 head of susceptible animals are in the affected area of Mexico. These animals are to be vaccinated three times within the next 1½ to 2 years, since disease resistance due to vaccination lasts only a few months.

Tuberculosis Threat

But hoof-and-mouth is not the only disease against which stockmen have to contend, Dr. Carr points out. Tuberculosis is also a constant threat. The best weapon, though not infallible, is tuberculin. Statistics tell of some success in the fight. In 1916, 2.35 percent of all cattle killed in the U. S. had tuberculosis. By 1947 the incidence had dropped to less than ½ percent. The 30-year eradication program has cost $250,000,000 and the removal of some 4,000,000 tuberculous animals. During the same period, the death rate in man dropped from 22.5 persons per 100,000 population to 2.4.

In California, the aim is to tuberculin-test each cow an average of once in two years. Between 50 and 60,000 head of cattle are tested each month.

Brucellosis, another domestic livestock disease transmissible to man, is coming under active control in California.

Dr. Carr reported that the comparatively new livestock illness known as X disease, observed in some 32 states, has not been reported in California. X disease, probably caused by a virus, attacks beef animals nine-to-one over dairy stock, mostly young stock being affected. The mortality rate is high—some 58 percent of infected animals.

Only by unremitting watchfulness and complete cooperation can these diseases be eradicated or even held within present boundaries.

Proposal of Cowlitz River Dams Opposed by Fish Industry

At a public hearing conducted by the Washington State department of conservation and development on the City of Tacoma's applications to build two hydroelectric dams across the Cowlitz River, Milo Moore, state fisheries director, testified the dams would destroy 243 miles of salmon spawning area and jeopardize an industry worth $1,000,000 annually.

"In no instance," declared Moore "have such artificial installations as hatcheries and fishways made up for the losses caused by dam-building. There are now more than 40 dams on the Columbia River, and 35 are complete barriers to migratory fish. We must set aside and improve the tributaries on both the Washington and Oregon sides of the lower Columbia to make up for these losses."

James H. Cellers, secretary of the Columbia River Salmon & Tuna Packers Assn., urged that the permit to build the dams be either denied or held in abeyance pending submission to the state legislature.

Some fishing industry members are wondering why, with atomic power prospects in the offing, War Department Engineers insist on building dams that will destroy or at least decimate a scarce natural resource. And they know that additional plants will result in more industrial wastes to pollute the rivers and further reduce fish survival.

Others argue that more land under cultivation means an even heavier production of carbohydrates, when the Northwest's greatest need is for proteins. Even the wheat raised in the area is too low in protein to be used for bread. "Why," they ask, "destroy nature's way of making up the deficiency?"

California Group Attacks Oleo Law of 1897

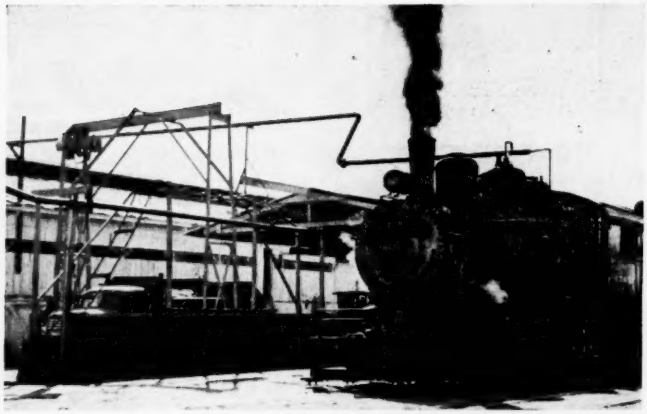
Latest skirmish between butter and margarine interests in the West is an attack by a new organization upon California's 1897 law prohibiting the sale of the colored product.

This group, the California Consumers' Committee for Yellow Margarine, aims to legalize coloring of margarine by the manufacturer. Its drive is coordinated with national efforts against "discriminatory taxes on oleo." Proponents of colored margarine cite its savings and convenience. Success of the move would depend on revision of the 1897 law, hence amendment by the state legislature is sought.

Margarine dealers in Montana won a major victory last fall when the state supreme court held that the tax provisions in a 13-year-old law were unconstitutional. The 4-to-1 decision stated that the law, which imposed license fees of $1,000 a year for wholesale dealers and $400 for retail dealers, was "intended to prohibit the sale of oleomargarine by the ordinary mill-run merchant" and that from such discrimination "the fundamental law of the land protects them."

OSC Construction

The proposed construction program at Oregon State College, Corvallis, includes an animal science and dairy manufacturing building and a food industries building.



Winemaking "Engine-uity"—

—and a veteran Santa Fe Railroad locomotive, kept wheels turning at Petri Wine Co's Tulare, Calif., plant this season. When boiler failure threatened to halt winery operations at peak of crush, Santa Fe responded to Petri's call for help by parking "Old 9021" alongside the plant. Soon the locomotive was pouring steam into the winery's lines through a series of specially rigged pipes—and operations commenced.

Grain Men Organize to Fight Against Freight Rate Rise

The Northwest Grain & Grain Products Assn. has been organized in the Pacific Northwest to fight for lower freight rates. Marion T. Weatherford, wheat farmer of Arlington, Ore., is president, and Oscar W. Hardesty, traffic manager for Centennial Flouring Mills, is vice-president. Pete Stallcop, secretary of the Pacific Northwest Grain Dealers' Assn., claims that rate increases in the last two years have halted Eastern movement of the area's grain and grain products. This situation calls for important consideration.

Better Vanilla Extracts Sought At Oregon State College

Development of improved vanilla extracts from different grades and varieties of vanilla beans is the aim of an extensive research being conducted at Oregon State College, Corvallis, under the supervision of Dr. G. H. Wilster, head of dairy manufacturing work.

Three panels of judges have been set up for the taste testing of ice cream shipped periodically from Chicago by air express to the dairy products laboratory of OSC. Ice cream is judged solely on the basis of the vanilla flavor.

The testing is being done at the request of the Flavoring Extract Manufacturing Assn., which asked Dr. P. H. Tracy of the U. of Illinois to recommend "four of the best qualified men interested in flavor in the dairy industry." Besides the U. of Illinois, other institutions participating are the U. of Missouri, and the state colleges of Pennsylvania and Michigan.

Reclamation of Brewers Yeast Offers Prime Possibilities

Refrigeration and dehydration of brewers yeast serves two main purposes, Adolph D. Schmidt, Jr., vice-president of Olympia Brewing Co., Olympia, Wash., told those attending the Western States Chemurgic Clinic at Washington State College, Pullman.

First, a former waste product becomes a good quality high protein food, containing, it is believed, all of the known B-complex vitamins. Second, reclamation of this fast-multiplying, uni-cellular plant considerably reduces the potential sewage disposal load.

Considering the efforts now being made to avoid land and water pollution by industrial wastes, the second purpose would seem reason enough for breweries to practice drying of excess brewers yeast. Even if it has to be sold at a near loss, Mr. Schmidt says, "it is probable that a small profit would be realized through the reduction of sewage disposal costs."

Frozen Condensed Orange Juice Production Now Increased

Hailed by some as the hope of the citrus industry, frozen condensed orange juice saves the buyer 75 percent of single-strength-juice freight costs, report canners in Brea, Calif. Orange County has already shipped its first million cans of the frozen product, and the second million is well under way. During November, 1948, ten rail cars were shipped, each containing 100,000 consumer-size cans, and each car representing juice from 200 tons of Valencia oranges.

Sardine Fishery Protection

By setting a limit of 14 inches on sardines caught during the spring season, the California Fish & Game Commission virtually declared a closed season on the scarce fish. The ban, which was in accordance with industry requests, runs from Jan. 16 to April 15 for northern California and from February 2 to April 15 for southern California.

Additional protection to the sardine fishery is the aim of the Division of Fish & Game's recommendation that the California Fish & Game Commission issue no sardine reduction permits for the 1949-50 season. Division Chief Richard S. Croker declared that sardines should not be used for other than human food purposes "until the depleted pilchard populations are brought back to something like their former level of abundance."

Air-Fertilizing

Spraying of fields with liquid fertilizer from low-flying planes is one of the latest accomplishments. Sought now, says A. L. Baxter, president of Central Aireraft, Yakima, Wash., is a spray solution which will decompose stubble and kill weeds, too. Seeding by plane is, of course, old stuff as is spreading insecticides. They say soon the farmer will have only to watch his crops grow—and foot the bills.

FOOD INDUSTRIES is published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder; James H. McGraw, Jr., President; Curtis W. McGraw, Vice-President and Treasurer; Eugene Duffield, Executive Assistant for Publications; Nelson Bond, Director of Advertising; Joseph A. Gerardi, Secretary. PRICE: 35¢ per copy. Subscription rates: U.S. and possessions, $3 for 1 yr., $4 for 2 yrs., $5 for 3 yrs. Canada, $4 for 1 yr., $6 for 2 yrs., $8 for 3 yrs. (payable in Canadian or U.S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yrs., $10 for 3 yrs. All other countries, $15 for 1 yr., $25 for 2 yrs., $30 for 3 yrs. Indicate position and company on subscription orders. Subscriptions invited only from food processing executives, engineers, technologists, operating supervisors, consultants and laboratories. EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. Cable address: "McGraw-Hill, N. Y." Address correspondence regarding subscriptions to J. E. Blackburn, Jr., Director of Circulation. PUBLICATION OFFICE: 99-120 N. Broadway, Albany 1, N. Y. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879. Return postage guaranteed. Member A.B.P. and A.B.C. Indexed monthly in Industrial Arts Index. Copyright 1949, by McGraw-Hill Publishing Co., Inc. All rights reserved.

How to Save Water in Canneries

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The rapid industrialization of certain parts of the West, coupled with a great increase in population, has severely strained water resources, with resulting critical shortages in certain areas. And this situation will become more acute as time goes on.

Closely allied to this is the pressing problem of waste disposal. By eliminating wastage of water, and by reducing its consumption wherever possible by re-use, some canners may be able to save 25 percent or more, depending on their present water usage.

In the past, the re-use of water by canners was discouraged, because of the problem of bacterial contamination with subsequent spoilage of cans. However, there are now available reliable chlorine dispensers, and the re-use of water for many operations is no longer a spoilage hazard.

The principal benefits to be gained by saving water are:

1. Conservation of a vital natural resource.
2. A substantial reduction in the total expenditure for water.
3. A great reduction in the amount of fluid waste, with a consequent saving in stream pollution, lagoon capacity, or sewer flow.

All industrial users of water must consider means by which their water consumption can be reduced, both as a measure of conservation and as a means toward reducing the amount of fluid waste.

Questionnaire Survey

To determine the extent of water re-use in canneries in the western states, a questionnaire was sent out in the spring of 1948. Replies were received from 116 canneries, only 34 of which were re-using any water, and most of these only to a limited extent. Some canners use considerably more water than others for the same operation, which is evidence that certain packers should be able to reduce their water consumption.

Great savings in the use of water can be made, and the purpose of this report is to indicate means by which this can be accomplished. In the table are listed the principal operations in a cannery, and the possibilities for re-using water.

At the present time a great deal of water is wasted in canneries due to inefficient use, and research on methods of reducing this waste is necessary. The two principal fields for such research are food conveying and can cooling. Serious thought should be given to means of conveying food and waste other than by fluming, and machinery manufacturers should concern themselves with the design of more efficient can coolers.

All water hoses should have automatic shut-off valves to prevent waste of water when the hoses are not in use. Consideration should be given to the use of high-pressure (rather than low-pressure), sprays for cleaning, because less water is required. Care should be taken to avoid unnecessary water overflow from equipment when it is not in use.

The following is a discussion of possible economies in the use of water from certain equipment:

Product Washers

Units for washing are of two principal types—immersion and spray. Immersion washers are generally used for preliminary washing; spray washers for the final washing.

Where a raw, unprepared product is given two successive cold-water immersion washings, the water from the second washing may be used for the first washing, if not heavily contaminated with organic matter or insects.

Spinach and tomatoes may carry large numbers of insects, which are picked up by the wash water and are not removed by screening. If this water is re-used, food subsequently passing through the line may become contaminated with these insect parts.

Water from can coolers may safely be used in immersion washers which are followed by spray washers, but no water from first washers should be re-used. Warm wash water should not be re-used because the bacterial count rapidly increases, and incipient spoilage before processing may occur in the food owing to this contamination. Only fresh water should be used for final washing.

Flumes

The purpose for which a flume is used determines the "purity" of the water necessary. In flumes for conveying and washing raw unprepared produce, such as whole pumpkins, peas from a viner, asparagus, fruits, etc., fresh water is not necessary. Instead, recovered can-cooling water may be used, provided it is cool and free of organic matter.

All partially prepared products, such as washed or blanched peas, beans, or asparagus, and diced fruits, carrots, etc., should be flumed in fresh water, and only fresh water should be used in flume blanchers.

Brines for fluming raw fish should meet the regulations for purity of the State Department of Public Health.

For conveying waste materials, any previously used water is satisfactory.

Water Blanchers

Only fresh water should be used in blanchers, regardless of the type. In drum, draper, and tubular blanchers where the product is immersed in hot water, there should be a large continuous replacement with fresh water. The re-circulation of water in blanchers and insufficient exchange of water is hazardous, because of the bacterial contamination of the product and the danger of incipient spoilage before processing. Re-use of water in blanchers also increases the danger of contamination with heat resistant thermophilic bacteria. Water from blanchers should not be re-used at any other place in the cannery, except for fluming wastes.

Can Coolers

During the early years of the canning industry, it was common practice to re-use water for cooling many times, after passing it over a cooling tower with little or no control of bacterial contamination. However, as the number of spoilage outbreaks from can leakage due to the use of contaminated cooling water increased, there was a gradual decrease in the use of cooling towers, and water from coolers was allowed to run to waste.

In some areas, the water supply problem has always been acute, and the re-use of water has been a necessity. Can coolers in which there is a continuous exchange of water present the same problem of bacterial contamination as water passed over cooling towers.

There are now on the market reliable gaseous chlorine dispensers which make it possible to reduce the bacterial population of water to a low level in the absence of excessive organic material. With adequate chlorination, the recirculation of water for can cooling is no longer hazardous.

Can coolers are of various types —batch coolers, such as retorts, in which cans are cooled after processing; spray coolers, in which the water goes to waste after passing over the cans; continuous coolers, with a constant exchange of water; and cooling canals. Water in continuous coolers and cooling canals should be chlorinated as a safeguard against spoilage due to

Water-Economy Check Table

Operation or Equipment	May Recovered Water be Used?	May Water From This Equipment Be Re-used Elsewhere in Plant?	Source of Water for Re-use in Equipment
1. Acid dip for fruit	Yes	No	Water from can coolers
2. Washing of product			
A. First wash followed by second wash	Yes	No*	Water from can coolers
B. Second or final wash of product	No	No	
3. Pump Elevators (peas, etc.)			
A. Raw product suspended in water	Yes	No*	Water from can coolers
B. Pumping of partially prepared product suspended in water	No	No*	
4. Flumes			
A. Fluming of unwashed or unprepared product (peas, pumpkin, etc.)	Yes	No*	Water from can coolers
B. Fluming prepared or partially prepared product	No	No	
C. Fluming of wastes	Yes	No	Any waste water
5. Lye peeling	Yes	No	Water from can coolers
6. Product-holding vats; product covered with water or brine	No	No	
7. Blanchers—all types			
A. Original filling water	No	No	
B. Replacement or makeup water	No	No	
8. Salt brine quality graders followed by a fresh water wash	No	Re-used in this equipment	
9. Washing pans, trays, etc.			
A. Tank washers—original water	No	No	
B. Spray or makeup water	No	No	
10. Lubrication of product in machines such as pear peelers, fruit size graders, etc.	No	No	
11. Vacuum concentrators	Yes	Re-used in this equipment after cooling and chlorination	Water from can coolers
12. Washing empty cans	No	No	
13. Washing cans after closing	Yes	No	Water from can coolers
14. Brine and sirup	No		
15. Processing jars under water	Yes	Re-used for processing	Water from can coolers, and processing or cooling water from other retorts used for processing glass
16. Can coolers			
A. Cooling canals		Water from these coolers may be re-used satisfactorily for cooling cans after circulating over cooling towers, if careful attention is paid to proper control of replacement water, and to keeping down the bacterial count by chlorination and frequent cleaning	
1. Original water	No		
2. Makeup water	Yes		
B. Continuous coolers where cans are partially immersed in water			
1. Original water	No		
2. Makeup water	Yes		
C. Spray coolers with cans not immersed in water	Yes	This water may be re-used in other places as indicated	
D. Batch cooling in retorts	Yes		
17. Clean-up purposes			
A. Preliminary wash	Yes	No	Water from can coolers
B. Final wash	No	No	
18. Box washers	Yes	No	Water from can coolers

*A certain amount of this water may be re-used in this equipment.

leakage. A chlorine residual of 0.5 to 1 ppm. at the discharge end of the cooler should be maintained to keep the bacterial population at a low level. In two-stage coolers, only the water in the second stage need be chlorinated.

If water from can coolers is re-used in the same equipment, it must be screened, cooled, and chlorinated sufficiently to maintain a low bacterial count. In order for chlorination to be effective, sufficient replacement water must be added to keep down the content of organic matter.

Handling Care

When water is re-used in coolers, great care should be taken to eliminate rough handling of cans, with denting at or near the double seams, which may result in leakage and consequent spoilage.

At the present time, the only economical means of cooling water are cooling towers. These are constructed principally of wood, which is porous and rapidly becomes saturated with water and organic matter. The tower is difficult to keep clean, and water passing over it frequently becomes contaminated with bacteria.

To keep the bacterial contamination at a low level, the following procedures are advisable:

1. *Chlorination.* Sufficient chlorine should be added to the water after it has passed over the tower to maintain a residual of approximately 0.5 ppm. at the end of the cycle. Since this amount is not adequate to prevent all growth of micro-organisms, the chlorine residual should be increased to 4-5 ppm. for a short time about every two weeks.

2. *Screening.* It is advisable to screen all water before passage over the tower, to remove any large pieces of organic matter.

3. *Can washing.* All cans should be thoroughly washed, preferably with hot water, after closing and before entering the cooker, in order to remove sirup, oil, or other adhering food material which might contaminate the cooling water.

4. *Replacement water.* Sufficient replacement water must be added to keep the water clear and free from excessive organic matter.

Factors in Re-Use of Water

If cooling water is re-used in other equipment than can coolers, a separate piping and pumping system is required, with no cross connections to the potable water supply. These pipes should be painted a distinctive color and warning signs against the misuse of such water should be conspicuously posted at all outlets. A holding tank of sufficient capacity is also necessary.

All water for re-use should first be screened. If used for cooling cans, it must be chlorinated, and chlorination is recommended for all re-used water. This aids in preventing slime formation in equipment, on floors, and in gutters and sewers. It also reduces the task of cleaning. The chlorine residual should be determined after the water has passed over the cooling tower, if used, or when it enters the distribution system, and should be adequate to reduce the bacterial count to below 100 per ml.

A chlorine residual of 0.5 to 1 ppm. should be sufficient for this purpose. Water should be discarded before it becomes too highly contaminated with organic matter, because organic matter greatly reduces the effectiveness of the chlorine. A close check on the chlorine residual should be kept at all times.

In plants where total chlorination of the water supply is practiced, the residual of 4-5 ppm. usually maintained may not be adequate if the water passes over a cooling tower. This is because the small amount of makeup water added does not supply enough chlorine to maintain a sufficient residual in the can cooling system. Consequently, an auxiliary chlorinator for the cooling water may be necessary.

Water must not be re-used for any purpose other than cooling cans if it has been treated with dichromate or other corrosion inhibitors. Contamination with iron may cause discoloration in certain products or spoilage in beets.

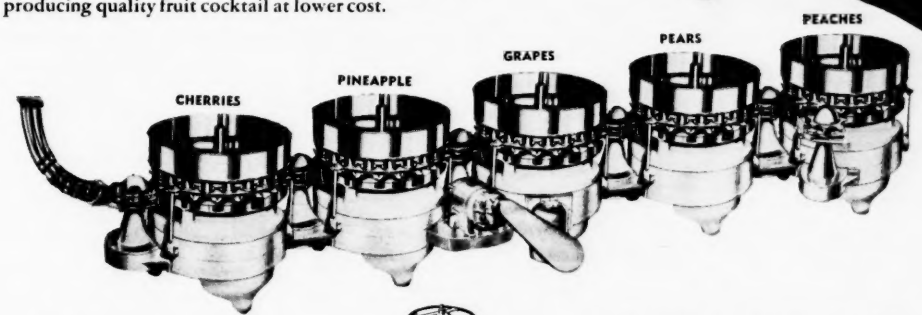
HERE'S YOUR KEY

to more profit... processing fruit cocktail

With just a turn of this wrench... and without stopping the Atlas-Pacific fillers... you can precisely control the cut-out of each ingredient going into fruit cocktail! Thus with the Atlas-Pacific HIGH-SPEED cocktail line you are able to increase case yield as well as production.

The entire line is driven by a single power unit through a simple train of enclosed gears... they can't get out of time! Notice, too, the Atlas-Pacific streamlined design which improves sanitation... lowers maintenance and cleaning costs.

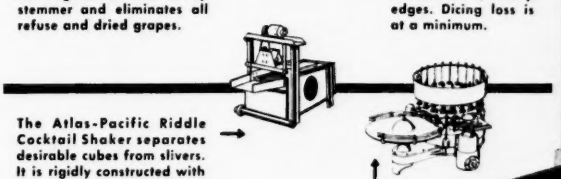
Illustrated below are other Atlas-Pacific machines used in producing quality fruit cocktail at lower cost.



The Atlas-Pacific Quality Grape Grader following the bunch breaker, collects clusters for rerunning, permits only grapes desirable for canning to continue to cap stemmer and eliminates all refuse and dried grapes.

Atlas-Pacific Grape Stemmer efficiently removes cap stems after grapes are separated from clusters.

Atlas-Pacific Fruit Dicer makes both the horizontal and vertical cuts simultaneously so that cubes have clean, sharp edges. Dicing loss is at a minimum.



The Atlas-Pacific Riddle Cocktail Shaker separates desirable cubes from slivers. It is rigidly constructed with accurately spaced stainless steel rods, large clean-out opening and can be supplied with a crankshaft or shaler shaker unit.

Atlas-Pacific Syrupers provide extremely uniform and accurate head space with minimum sugar loss.

FREE CATALOG. Please write on your firm's letterhead for the new Atlas-Pacific Filler Catalog. Inquiries are also invited for Atlas-Pacific machines of standard and special design for all types of food processing and handling.

ATLAS-PACIFIC ENGINEERING COMPANY, INC.

1321 67th Street • Emeryville, Calif.

LLOYD A. ROYAL, chief biologist of the Washington State Department of Fisheries, has been appointed chief biologist for the International Pacific Salmon Fisheries Commission. He has been with the state organization for the past 20 years.

Industry

CONTINENTAL CAN CO'S new plant at Portland, Ore., will not start production until about 1950 because of equipment shortages. H. A. Eggers, president of the company, said that $2,500,000 worth of machinery intended for the Portland plant had been diverted to another and that replacement will require about a year. Until the plant is ready for operation, it will be utilized as a storage and shipment depot.

The $1,250,000 Portland plant ranks in size with Continental's two other Pacific Northwest plants at Seattle and Walla Walla. The building was sold recently by Continental to New York Life Insurance Co. in exchange for a long-time lease.

PILLSBURY MILLS, INC., has closed the pancake flour section of its Portland, Ore., plant and is moving the machinery used in the operation to other company plants. According to local officials, the largely seasonable operation was discontinued because officials considered it unprofitable.

ZELLERBACH PAPER CO. expects completion of its Salt Lake City plant by April 1949, says E. A. Breyman, San Francisco, vice-president in charge of operation. Located on a 2-acre site, the building is expected to cost between $300,000 and $500,000.

UNION FISHERMEN'S COOPERATIVE PACKING CO., Astoria, Ore., has completed installation of new oyster canning equipment, all specially designed and Astoria-built. Oysters from the company's 1,300-acre tract in Willapa Bay will be fresh-shucked by knife. Capacity of the new operation, which is set up in the main cannery, is between 200 and 300 cases a day.

SMITH PACKING CO., San Bernardino, plans construction of a fifth meat cooler room. Cooler will be connected to an inclosed and refrigerated shipping dock, where meat can be transferred to refrigerator trucks at minimum temperatures summer or winter. The company now processes 300 to 400 head of beef cattle and calves weekly, in addition to 200 to 250 head of hogs and 200 lambs and sheep. Smith Packing is headed by D. R. Smith, who is also president of the Colton Cattle & Feed Co., which acts as a buyer of stock.

C. F. DENGLEMAN, Fresno, raises, processes and sells turkeys on his own ranch. During the 1948 holiday season, 3,000 birds were marketed. The 30 employees work with model equipment, including defeathering machine, eviscerating room, walk-in holding box, and sales and display room. Growing turkeys roam a fig orchard, the floor of which is strewn with shavings to prevent a dust nuisance.

THE OREGON LIVESTOCK COOPERATIVE expects completion of its new abattoir and packing plant at Clackamas by about April 1, 1949. Cost of the project is now figured at $150,000, some $50,000 above the original estimate. Cooperative members, numbering more than 1,000, reside in Eastern Oregon and Washington and in the Northern Willamette Valley. The livestock supply is expected to be sufficient to keep the plant in continuous operation.

TILLAMOOK MEAT CO., Tillamook, Ore., is planning a new $40,000 slaughter plant, located on a 10-acre tract. Owners are Denny Flatz and Roy Grant.

THE MIDSTATE PACKING CO., Toppenish, Wash., has completed plans for remodeling its plant to meet federal inspection specifications. Cost is estimated at $40,000.

STANDARD DAIRY, Longview, Wash., has awarded a general contract for construction of a new dairy plant in that city, according to Norman Tolleshaug, manager. Total cost of the 80 x 85 ft. building and new equipment will probably exceed $100,000.

GOLD CANDY CO., Los Angeles, recently formed by Nestor L. Gold, has taken over building and equipment of Select Candies at 3232 E. Olympic Blvd. With added equipment and 50 employees on two shifts, the company will supply boxed candy to chains, drug stores, and supermarkets in the eleven western states. Nestor Gold was formerly with the L. A. Nut House.

Personnel

ARTHUR E. SYMONS, Hershey Packing Co., Seattle, has been elected 1949 president of Northwest Frozen Foods Assn. Arthur L. Reiling, Birdseye-Snider, Hillsboro, Ore., is vice-president, and E. M. Burns, Portland, remains sec.-treas.

RICHARD S. CROKER, chief of California's Bureau of Marine Fisheries, has been elected chairman of the Pacific Marine Fisheries Commission for 1949. Milo Moore, director of Washington fisheries, was named vice-chairman. Croker succeeds John C. Veach, chairman of the Oregon Commission, on a rotation basis for the tri-state body.

R. A. BEATY, an executive of Golden State Co., Ltd., San Francisco, has been elected 1949 president of the California Creamery Operators Assn.

GENE STANTON, Yakima, succeeds H. S. Records, Everett, as president of Washington State Beekeepers Assn. S. R. McAlpine, Orchards, becomes vice-president, and C. A. Dark, Spokane, succeeds Howard S. Graff, Bow, as sec.-treas.

W. P. RITTER, co-owner of the Nehi-Royal Crown Co. of Phoenix, has been elected 1949 president of Arizona State Bottlers Assn. Howard C. Phillips, Douglas, is vice-president, and W. R. Hood, Phoenix, remains secretary.

R. G. LUCKS and WILLARD C. GRIFFIN were elected vice-presidents of California Packing Corp., San Francisco, at a recent meeting of the board of directors. Irving H. Granicher was appointed general sales manager.

PAUL F. SHARP, director of research for Golden State Co., Ltd., San Francisco, and formerly professor of dairy chemistry in Cornell University, has been named director of the California Agricultural Experiment Station, University of California. Sharp succeeds C. B. Hutchison, who has held the position in addition to that of dean of the College of Agriculture. Dean Hutchison will remain as head

of the College of Agriculture and will retain his title as vice-president of the University.

FRANK E. BUCK, president of Golden State Co., Ltd., San Francisco, since 1937, has resigned that position because of ill health but will continue as a director. Paul Young, vice-president and general manager, succeeds Buck as company head, and has been appointed a director of the firm. Young, with Golden State since 1938, became vice-president in 1947 and general manager in March 1948.

HANS ERLANGER has been named general sales manager of Hunt Foods, Inc., Los Angeles. He has been a sales executive of the company since 1946.

FLOYD O. SMITH has been appointed sales manager of the newly-formed White Rock Bottling Co. of Arizona. Smith has had ten years' experience in the field in Arizona and on the West Coast.

HUBERT J. SOHER, partner in Walston, Hoffman & Goodwin, San Francisco stockbrokers, has been appointed a director of Langendorf United Bakeries, Inc.

WESTERN EVENTS

February, 1949

7- 8—California Bottlers Assn. of Carbonated Beverages, annual convention, St. Francis Hotel, San Francisco.
7-10—National Assn. of Refrigerated Whls., annual convention, San Francisco.
10-11—Western Frozen Food Processors Assn., annual convention, sample grading; Fairmont Hotel, San Francisco.
7-18—Canners' & Frozen Food Packers' School, 28th annual meeting, Oregon State College, Corvallis, Food Technology Dept.
14-16—American Dry Milk Institute, Inc., national meet for Pacific Slope area, at St. Francis Hotel, San Francisco.

March

2—California Section of AACC, monthly meeting, El Jardin, San Francisco. Speaker, W. V. Cruess, U. of Calif., "Use of Fruits as Cereal Additives."
4- 5—Utah Canners Assn., 37th annual convention, Hotel Utah, Salt Lake City.
9-11—Canners League of Calif., annual convention, Casa Del Rey Hotel, Santa Cruz, Calif.

April

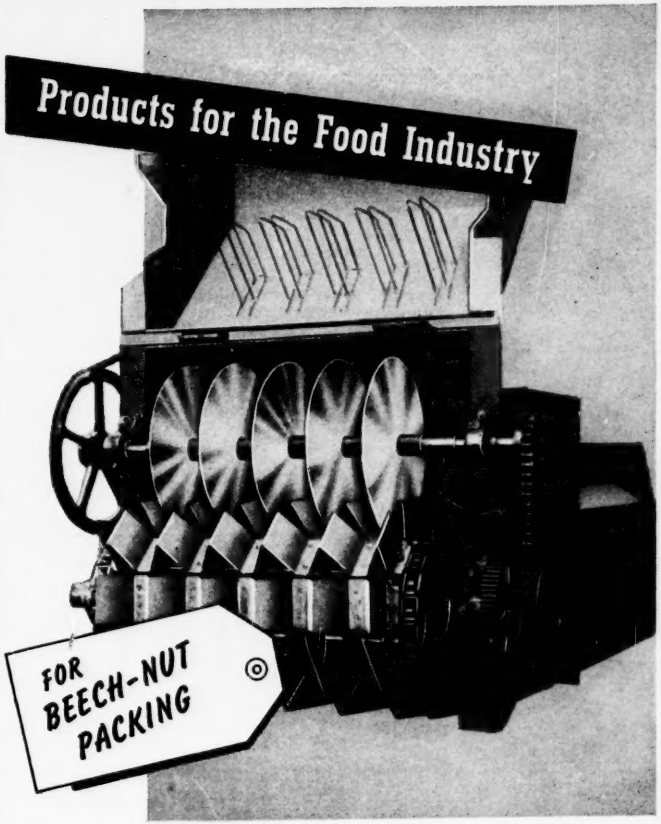
12—Monterey Fish Processors Assn., annual meeting, Monterey, Calif.

June

4-12—Bay Area Industrial Exposition, Oakland Exposition Bldg., Oakland, Calif.

July

11-14—Institute of Food Technologists, 9th annual conference, San Francisco.



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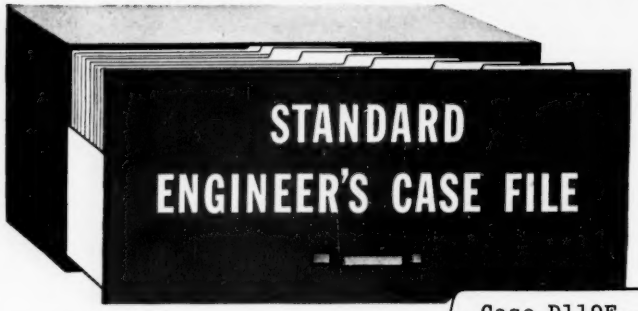
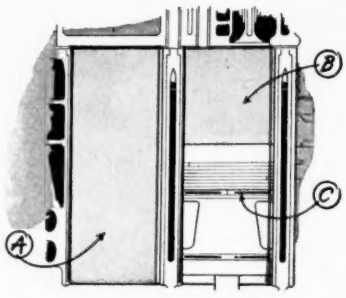


Case D119E--Reducing Wear on Liners in Diesels



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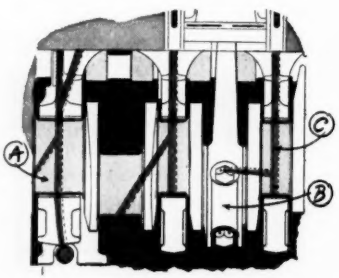

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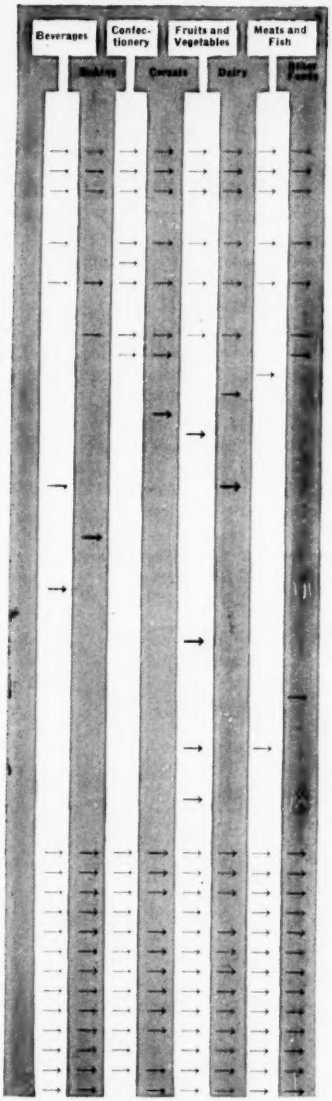

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FOOD INDUSTRIES is published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder; James H. McGraw, Jr., President; Curtis W. McGraw, Vice-President and Treasurer; Eugene Duffield, Executive Assistant for Publications; Nelson Bond, Director of Advertising; Joseph A. Gerardi, Secretary.

PRICE: 35c per copy. Subscription rates: U.S. and possessions, $3 for 1 yr., $4 for 2 yrs., $5 for 3 yrs. Canada, $4 for 1 yr., $6 for 2 yrs., $8 for 3 yrs. (payable in Canadian or U.S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yrs., $10 for 3 yrs. All other countries, $15 for 1 yr., $25 for 2 yrs., $30 for 3 yrs. Indicate position and company on subscription orders. Subscriptions invited only from food processing executives, engineers, technologists, operating supervisors, consultants and laboratories.

EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. Cable address: "McGraw-Hill, N. Y." Address correspondence regarding subscriptions to J. E. Blackburn, Jr., Director of Circulation.

PUBLICATION OFFICE: 99-120 N. Broadway, Albany 1, N. Y. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879. Return postage guaranteed. Member A.B.P. and A.B.C. Indexed monthly in Industrial Arts Index. Copyright 1949, by McGraw-Hill Publishing Co., Inc. All rights reserved.

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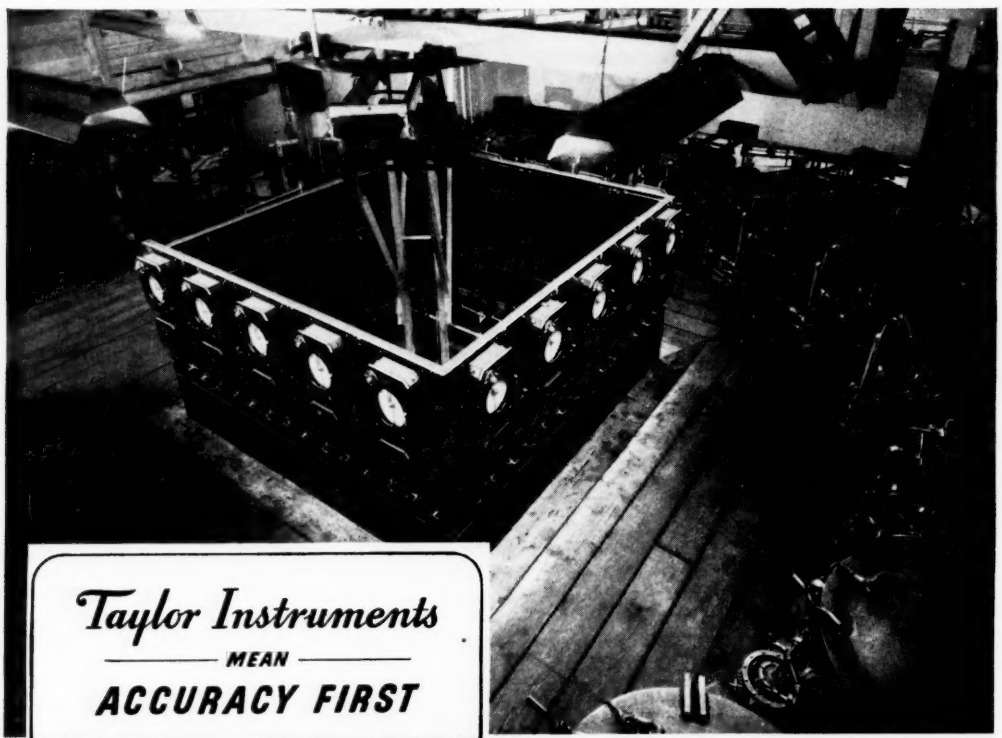

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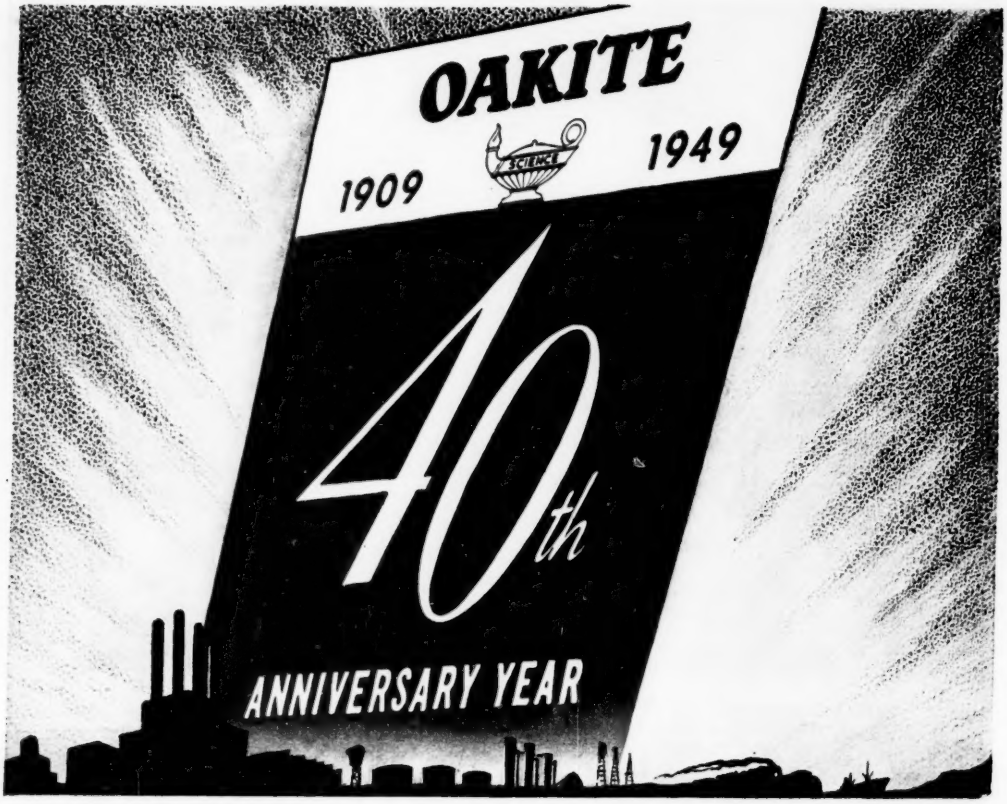

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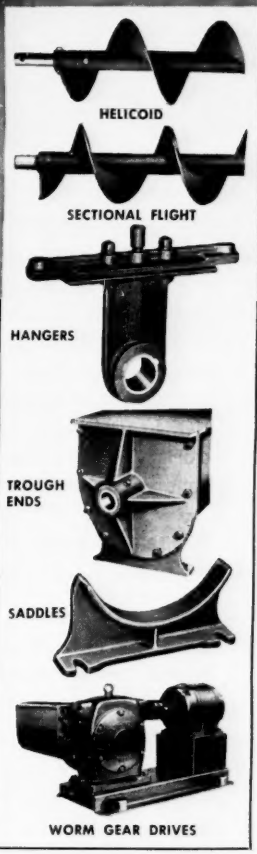

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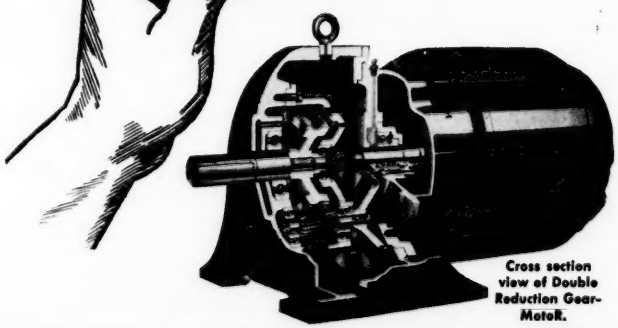

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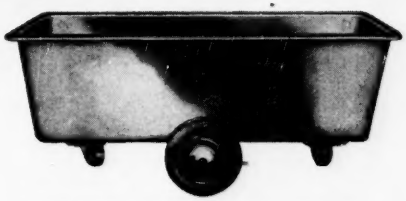

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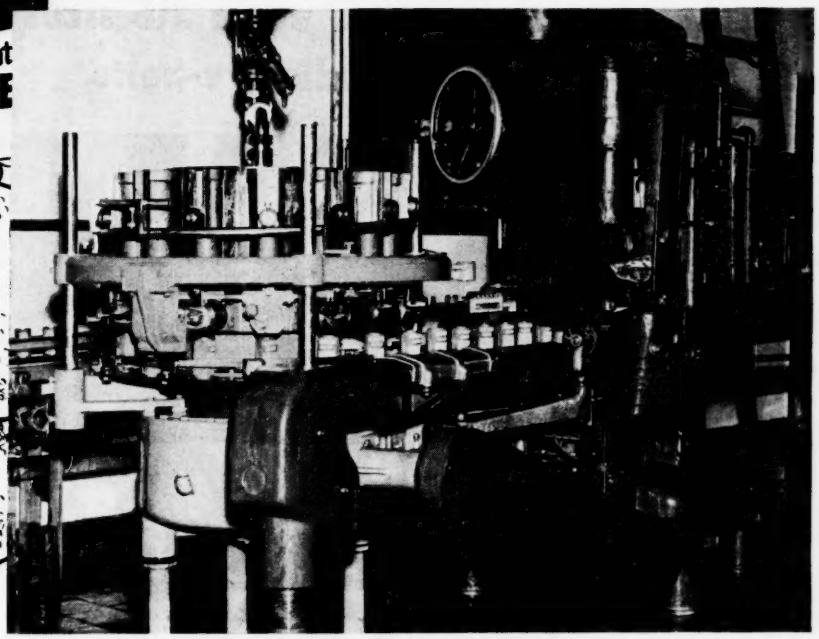

Pfaudler Piston Filler in operation at Vacuum Foods Corp., Orlando, Fla., for filling semi-frozen orange juice.

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Whether you pack semi-frozen citrus juices or any other semi-liquid or semi-solid product, you can depend on Pfaudler Piston Fillers to give you fast, clean filling with maximum convenience and a minimum of maintenance.

Equipped with a *single point* adjustment for accuracy of fill, Pfaudler fillers are easy to shift from one job to another. A no-can-no-fill device prevents waste. All movable contact parts are removable for cleaning by hand. They are made of corrosion resisting metals. Fully enclosed and sanitary in design, Pfaudler Piston Fillers are the last word in efficiency. Easily adapted to all closing machines. Ask for Bulletin Fl-848.

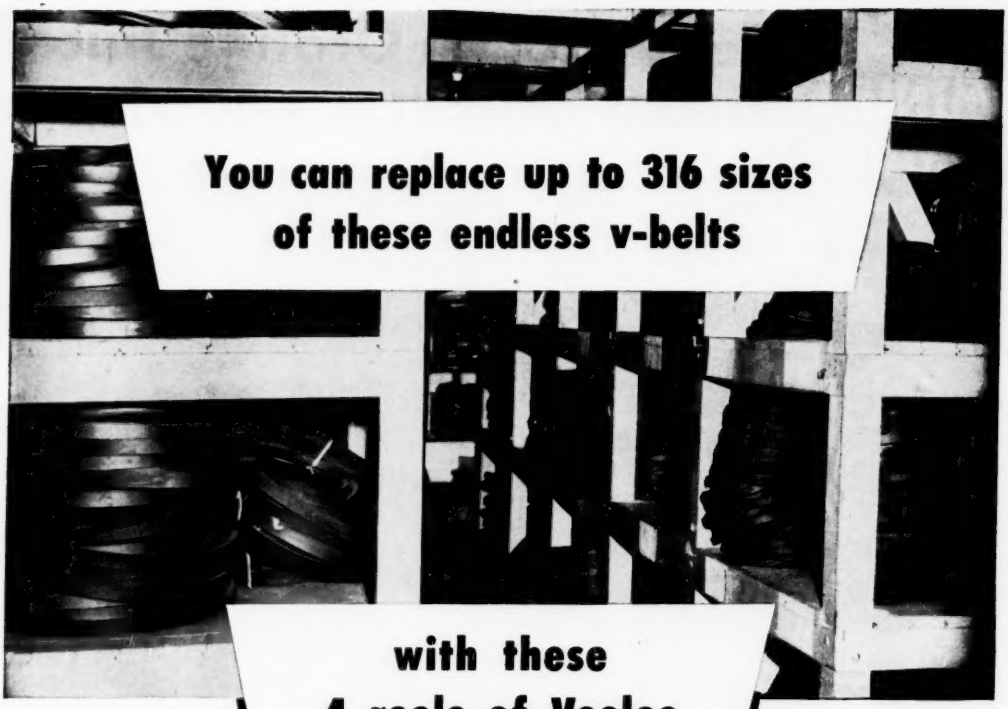
Pfaudler

THE PFAUDLER CO., Rochester 3, N. Y. Branch Offices: 330 West 42nd St., New York 18, N. Y.; 111 W. Washington Ave., Chicago 2, Ill.; 1325 Howard St., San Francisco 3, Calif.; 818 Olive St., St. Louis 1, Mo.; 63 West Milwaukee Ave., Detroit 2, Mich.; 1318 1st Nat'l Bank Bldg., Cincinnati 2, O.; 1041 Commercial Trs. Bldg., Philadelphia 2, Pa.; 751 Little Bldg., Boston 16, Mass.; 334 Chattanooga Bank Bldg., Chattanooga, Tenn.; P.O. Box 4186, Dallas, Texas; Enamelled Metal Products Corp., Ltd., Artillery House, Artillery Row, London, S. W. 1, England.

THE PFAUDLER CO., ROCHESTER 3, NEW YORK

ENGINEERS AND FABRICATORS OF FOOD PROCESSING EQUIPMENT

Glass-Lined Steel . . . Stainless Steels . . . Nickel . . . Inconel . . . Monel Metal



You can replace up to 316 sizes of these endless v-belts

with these 4 reels of Veelos

Just four reels of Veelos in your stockroom give you replacements for as many as 316 sizes of endless V-belts. Very likely you require less. One reel may give you a complete V-belt inventory. With Veelos, the link V-belt, any length belt is quickly uncoupled, made endless and installed. Belt replacements for any type drive are always immediately available. Standard reels hold 100 feet, save storage space.

Ease of installing Veelos provides substantial savings in installation time. On drives with fixed centers, it is installed without moving the motor or dismantling the machine.

Veelos is available in all standard sizes . . . fits all standard grooves. Sales engineers in principal cities; 350 Veelos distributors throughout the country.

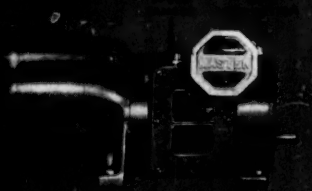
VEELOS
THE LINK
V-BELT

NEW CATALOG gives you all the facts about the important advantages of Veelos and supplies complete engineering data. Fully illustrated, it shows Veelos at work in industry after industry. Your copy sent on request.

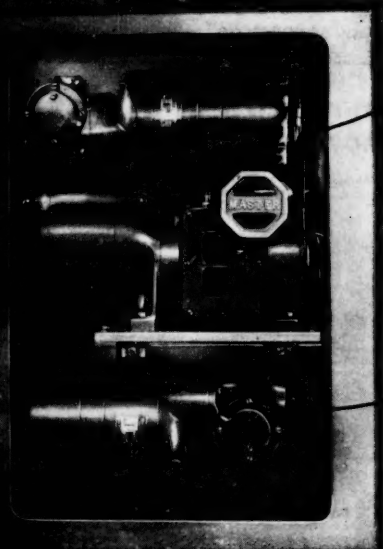
MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PENNSYLVANIA

VEELOS is known as VEELINK outside of the United States

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE



Easy does it



Don't put up with make-shift assemblies when it is so easy to get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Master Motors, available in millions on millions of combinations of types and ratings, permit you to use a power drive on each job that's just right . . . a power drive that will add greatly to the compactness, appearance, and economy of each of your applications.

Use Master Motors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

Here's the *New, Improved* TRI-CLOVER *EXPANDING-TYPE* SANITARY FERRULE

NEW INTERIOR GROOVED FINISH GRIPS EXPANDED TUBING SURFACE FOR POSITIVE, LEAK-TIGHT JOINTS . . .

PRESSURE TESTS PROVE RESULTS!

Independent testing laboratories recently tested sample Tri-Clover expanded joints made with standard ferrules and stainless steel tubing, to determine their holding power. Under compression test, with pressures in excess of 18,000 PSI, there was no evidence of the ferrule being separated from the tubing at any point! Illustrated above is an unretouched view of one of these joints after being subjected to this severe test..

HERE'S a *good* product made even *better* . . . the tested and proved *Tri-Clover Sanitary Ferrule.* As illustrated above, the new interior of this ferrule now consists of definitely separated "phonograph-finish" grooves or shoulders, separated by wider bands of smooth metal. When stainless steel sanitary tubing is expanded into this accurately machined surface (through use of tools shown below) you get an approved leak-tight joint that will stand up under continual hard usage, shock, vibration.

THESE SUPER-SPEED *TOOLS PROVIDE 60% FASTER JOINT ASSEMBLY*

Vise and Expansion Blocks . . . hold Ferrules securely for expansion and facing of tubing.

Torquometer . . . Provides easy expansion, through predetermined inch-pound pressure.

Expanders . . . Simple, efficient tools for accurate expansion, even with inexperienced personnel.

Seating Tool . . . Provides both inside and outside bevel. Also used for facing.

Write for Super Speed Tool Catalog 347

See your nearest Tri-Clover jobber for complete details and literature

Tri-Clover
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

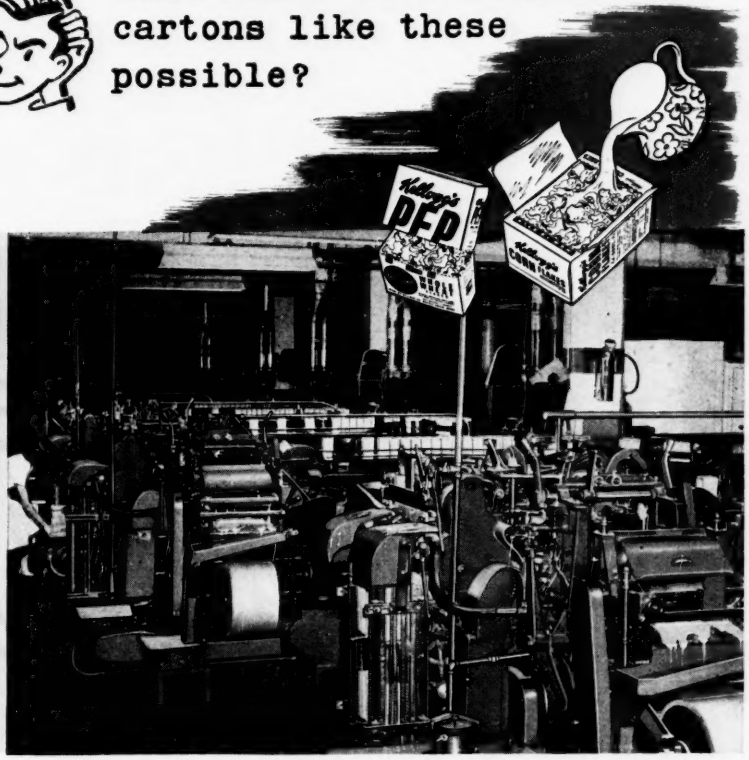
TRI-CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

QUESTION:

What makes self-dispensing cartons like these possible?



Foods now packaged on this type machine:

- CEREALS
- POWDERED SUGAR
- CORN STARCH
- CANDY MIX
- DESSERT POWDER
- TEA
- PRUNES
- BROWN SUGAR
- DRIED FRUIT
- PREPARED FLOUR

Photograph at right shows installation of Double Package Maker equipment in Kellogg's famous plant at Battle Creek, Michigan.

ANSWER:

Pneumatic's Double Package Maker machine!

Packaging men describe it as "a package within a package". Any way you look at it, packaging took a huge stride forward when Pneumatic developed the machine to make it.

Simply stated, Pneumatic's Double Package Maker shapes a protective paper lining, then forms an outer carton around it to produce a hand-in-glove fit. The result is an exceptionally tight container that permits maximum fill. One machine, one operation – but double protection for the product! Out of this idea, Kellogg developed its ingenious Kel-Bowl-Pac that opens to form a receptacle from which, with cream added, the cereal can be eaten!

Kellogg, like many famous companies selling many different kinds of products, in packages large and small, uses Pneumatic machines of various types. Pneumatic builds more than ninety different packaging and bottling machines designed to help industry do a better packaging job at a "lower cost per container".

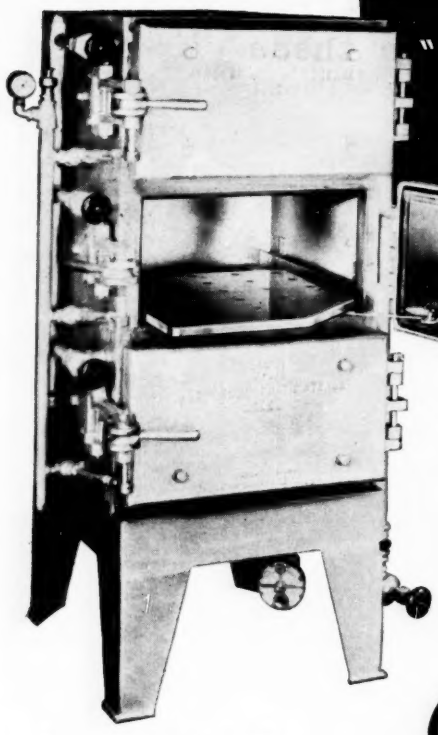
* * *

PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, North Quincy 71, Mass. Branch Offices in New York, New York: San Francisco, California; Chicago, Illinois; Los Angeles, California; Seattle, Washington.

PNEUMATIC

PACKAGING AND BOTTLING MACHINERY

Over ninety different machines for the packaging of dry, free-flowing products and the cleaning, filling, capping and labeling of containers for liquids and semi-liquids



"A CORROSION-RESISTANT INTERIOR AND THICKNESS TO WITHSTAND STEAM PRESSURE...

Clad Steel gives us both economically"

Steam cooker made of 10% Nickel-Clad Steel by The John Van Range Co., Cincinnati, Ohio

They get all the advantages of a solid nickel wall but at the lower cost of Lukens Nickel-Clad Steel: that's the reason The John Van Range Co. gives for using clad steel here. The nickel interior is highly resistant to the attack of steam and moisture, fats, food acids and corrosive vapors. It combines with the steel backing plate to give stiffness and high strength.

Thus, this clad steel steam cooker has long life with low upkeep. And there's no contamination of foods prepared in it.

In Lukens Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad Steels a uniform cladding of the corrosion-resistant metal, 10% or 20% of total plate thickness, is permanently bonded to the steel backing plate. The extra-smooth sodium hydride finish makes equipment extra easy to clean.

Ask your supplier to quote on equipment made of Lukens Clad Steels. For further data on these materials, write for Bulletins 255 and 338. Lukens Steel Company, 401 Lukens Building, Coatesville, Pa.

CLAD METAL STEEL

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

Two 16mm Kodachrome motion pictures—"The Manufacture of Lukens Clad Steels" (silent) and "Solving Corrosion Problems" (with sound)—will be loaned to you. Write for booking date.

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

How to make stainless steel go much farther

ENGINEERING B-W PRODUCTION

INGACLAD

In many industrial applications, stainless steel protection is needed *only* on one side—the exposed or contact side. So *solid* stainless is not required.

That's where IngAclad Stainless-*Clad* Steel comes into its own. IngAclad is a 20% cladding of solid stainless bonded to an 80% backing of carbon steel. Thus IngAclad provides 100% stainless protection against rust, corrosion, abrasion and erosion *on the contact side.*

The advantages are obvious. *Lower material cost. Fabricates easily.*

Would you like to see how IngAclad can fit into *your* production picture? Consult our engineers—without obligation. INGERSOLL Steel Division, Borg-Warner Corporation, 310 South Michigan Avenue, Chicago 4, Illinois.

VACUUM SEAL UP TO 500 PER MINUTE with Anchorvac* N Caps

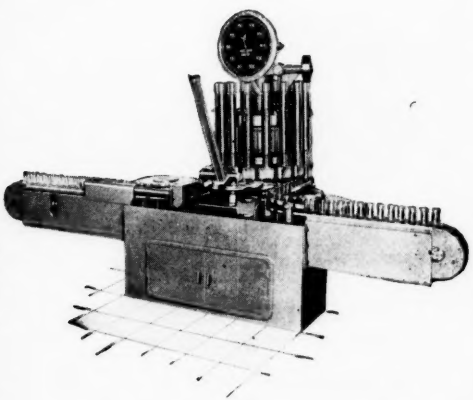
NOT every packer requires a sealing speed as high as 500 per minute. But if you do, the *Anchor* 16 Spindle Rotary Sealing Machine will apply *Anchorvac* N Caps at that speed.

If your sealing requirements fall in the 20 to 250 per minute range, there are other types of *Anchor* sealing machines to meet your particular requirements. These, as well as the 16 Spindle Machine, are supplied at a nominal rental.

Anchorvac N Caps are adaptable to all types of glass packed food products requiring or benefiting by a vacuum seal, whether packed hot or cold, sterilized or processed.

Call your nearby Anchor Hocking representative or write us for closure samples and full information regarding *Anchorvac* N Caps and *Anchor* Sealing Machines to apply them.

* Trade-Mark



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

ON CONVEYORS

It's shock-resistant Anchorglass*

CONVEYORS move glass containers from station to station, 'round 90° turns, at seemingly incredible speeds. There's bound to be ganging-up of containers and resultant friction, knocks and shocks on these modern high-speed conveying lines.

Anchorglass containers are designed and manufactured to withstand such handling; to give a consistently high level of performance on your packaging lines. They're tough and strong—the result of uniform distribution of glass, consistency in manufacture, accurate temperature control in annealing, an exacting quality control program and a constant emphasis on higher manufacturing standards.

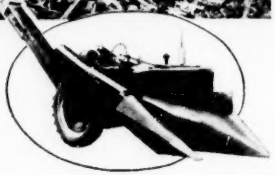
Write us for samples for test purposes. *Anchorglass* containers are available in crystal, amber and emerald green glass, in all popular styles, capacities and finishes.

*Reg. U. S. Pat. Off.

ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

CORN CANNERS

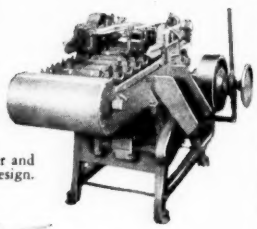
New FMC sweet corn harvester



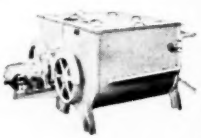
We now offer the first commercially successful Sweet Corn Picker for the Canner. It has been thoroughly tested from Texas to Canada, from Maine to Oregon. Its dependable operation insures a continuous supply of freshly picked corn to the Canning Plant.

FMC DOUBLE HUSKER

Assures practically 100% perfect husking, due to vibrating hopper and advanced husking-roll design.



No. 2 Universal Corn Cutter



Stainless Sanitary Batch Mixer

Greater SPEED—QUALITY—YIELD

The FMC Sweet Corn Harvester is a two-row type, suitable for mounting on commercial farm tractors. It picks the ears from two rows at a time, and its precision operation prevents bruising or crushing of kernels, thus stepping up yield and quality. Rapidly rotating cutters sever the ears at the shank and they are carried up by conveyor and discharged into a trailing corn wagon.

DO YOU HAVE FMC CATALOG 800?

Canners of Corn, Tomatoes, Peas, Beans, Fruits, etc., find the modern FMC Machinery in this 260-page Book their best method of Keeping Processing Costs Down and Keeping Quality and Yield UP!

A-500

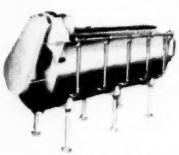
FOOD MACHINERY AND CHEMICAL CORPORATION

SPRAGUE-SELLS DIVISION • HOOPESTON, ILLINOIS

Sales Branches: Baltimore, Md. • New York, N.Y. • Rochester, N.Y. Bradford, Vt. • Cedarburg, Wis. • Lakeland, Fla. (Florida Division) San Jose, Calif. (Anderson-Barngrover Division)

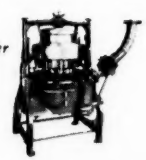
Peerless Corn Washer

Model 8 Corn Silker

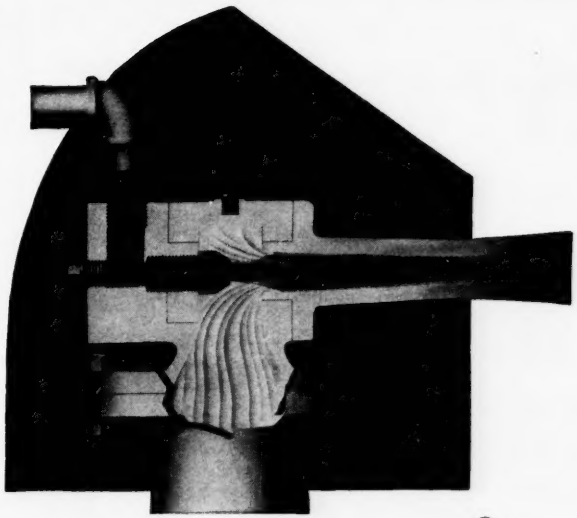


Stainless Sanitary Blending Mixer

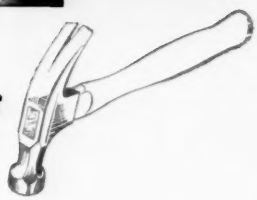
M & S Filler



an ƒ "reason why"



no more complicated than a hammer



A hammer is a simple, functional tool.
It has nothing to get out of order.
ƒ Jet Pumps are similar to a hammer.
They have no moving parts to get out of order.
They have no glands to adjust or replace . . .
No bearings, no rotating or reciprocating parts to wear.
They lift or transfer liquids or solids . . .
Exhaust liquids from tanks . . .
Produce vacuum or pressure . . .
Mix and agitate liquids . . .
Mix gases . . .
And perform many other functions . . .
SIMPLY!
Assure yourself efficient operation.
Eliminate "down time" and maintenance.
Reduce your costs.
Send, today, for Bulletin J-1.
Find out how ƒ Jet Pumps can work for you.

SCHUTTE & KOERTING COMPANY
Manufacturing Engineers
1157 THOMPSON STREET • PHILADELPHIA 22, PA.

JET APPARATUS • HEAT TRANSFER EQUIPMENT • STRAINERS • CONDENSERS AND VACUUM PUMPS • OIL BURNING EQUIPMENT • ROTAMETERS AND FLOW INDICATORS RADIAFIN TUBES • VALVES • SPRAY NOZZLES AND ATOMIZERS • GEAR PUMPS

CLEAN

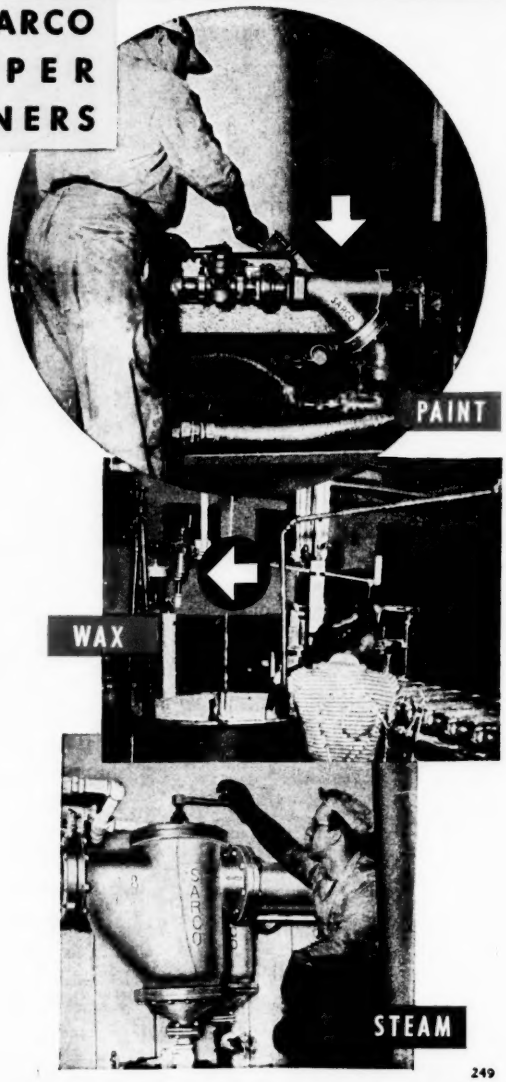
PAINT, WAX
STEAM...
OR ANY LIQUID

WITH SARCO
SCRAPER
STRAINERS

Any liquid that can flow through a pipe can be free from impurities down to any size screen you select, with the Sarco Scraper Strainer. It's the last step and a final insurance of the product just before packaging. In the paint plant illustrated, a Sarco is on each of the three tanks in front of the automatic canning machine. The strainer screens are cleaned every few hours by a turn of the handle.

In a large metal plant, exhaust steam from hammers, formerly unusable because of the lint and dirt, is now used for heating. Food syrups, river water and hot wax are other applications.

Standard Sarco Strainers are made in four types, ¼" to 8" for pressures up to 900 pounds. Scraper strainers ¾" to 8" and 200 pounds, hand or motor operated. Ask for Catalog Nos. 1200 and 1225.



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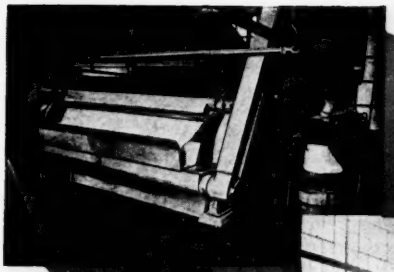
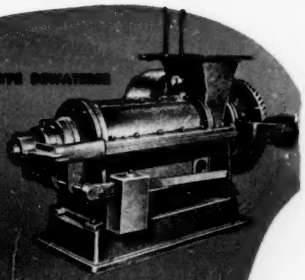
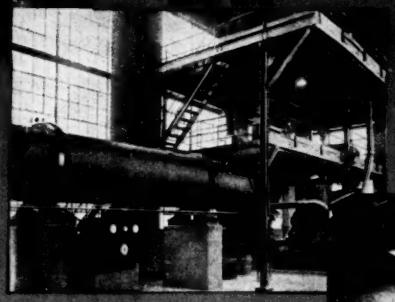
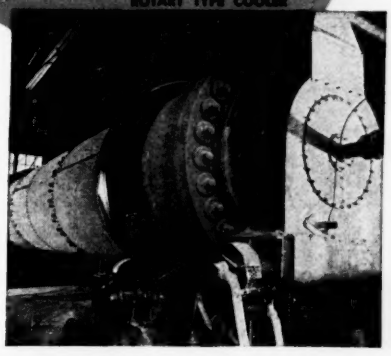
SARCO
SAVES STEAM

SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 8, ONTARIO









INTEGRATED EQUIPMENT IS MORE EFFICIENT

Processes involving drying, dewatering, cooling, etc. can, through proper integration of equipment, be made more profitable.

The knowledge and experience gained over a period of many years designing, fabricating and servicing various types of dryers, dewaterers, thickening screens, coolers, etc., for use in the food industry, is incorporated in recommendations made by General American engineers.

In many instances, these recommendations have not only resulted in more efficient equipment performance but opened up new avenues of profits.

If you are contemplating a new plant, or the modernization of existing facilities, ask a General American engineer to assist you.

Other GENERAL AMERICAN EQUIPMENT FOR THE FOOD INDUSTRIES

Evaporators
Thickeners
Turbo-Hydrogenators
Malek Rice Process
Citrus Process
Filters
Turbo-Mixers

GENERAL AMERICAN TRANSPORTATION CORPORATION

Process Equipment Division

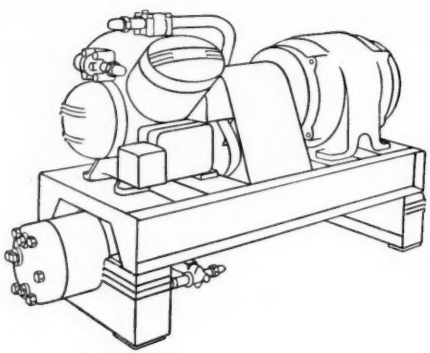
SALES OFFICE: Hoffman Building, Dept. 840, Louisville 2, Ky.

WORKS: Sharon, Pa., East Chicago, Ind.

TRADE MARK

OFFICES: Chicago, New York, Cleveland, Orlando, Pittsburgh, St. Louis, Salt Lake City, Sharon, Washington, D. C.

Customized refrigeration at no extra cost



You don't want refrigeration that is *almost* right for your food plant. Such a set-up is wasteful, uneconomical. You want an installation that exactly fits your needs—and that's what you get with Carrier Customized Refrigerating Units.

In all, these units give you a choice of more than 1000 different combinations, with Carrier Customized Compressors meeting every food-plant requirement from 5 to 100 hp. And because all the units—condensers, drives, motors, compressors—are designed and precision-made to work together, the Carrier refrigerating machine assembled for you provides maximum efficiency at minimum operating cost. Equally advantageous, because these units are standard at Carrier, there's no extra cost for what is virtually a "tailor-made" installation.

On job after job, Carrier Compressors have proved themselves dependable, economical performers. And with good reason. They have ten outstanding features never before combined in one compressor!

Carrier offers you a wide choice, too, of Spray-type and Dry Coil-type Cold Diffusers. Built with all the experience and skill that have made Carrier a leader in the refrigeration field, they are perfect partners for Carrier Compressors. With Carrier refrigeration all the way, you've made the best investment you possibly can for your food plant. Why not write today for Catalog 5FH1? Carrier Corporation, Syracuse, New York.

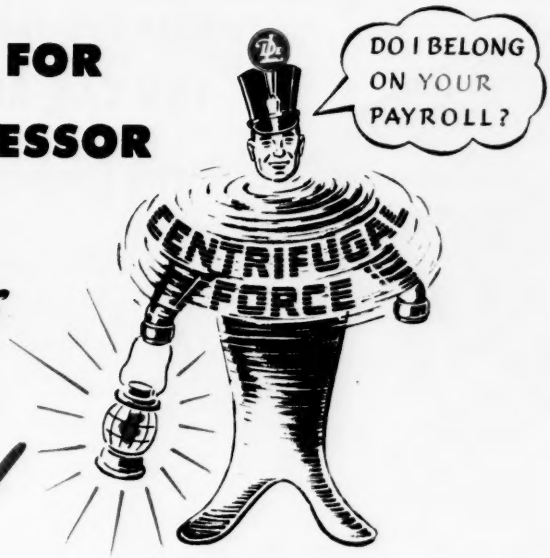
Carrier AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

I'M LOOKING FOR A FOOD PROCESSOR

who wants to do things

★ *faster*

★ *better!*



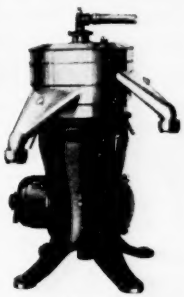
JUST by way of example — processing SOUP

De Laval Centrifugal Separators skim grease off chicken broth. Others take seed and dirt from tomato pulp for tomato puree. Both applications were developed after tests showed the practicability of the idea.

Do you have a point in your "production line" where separation of liquids or clarification of a liquid slows up your process because everything else is continuous and those phases are not? If so, De Laval Centrifugal Force may enable you to speed up your process and get rid of the bottleneck.

It's been done—many times. De Laval Centrifugal Force has already speeded up the separation of yeast from wort, has removed burnt crumbs from cooking fat, continuously extracted oil from meal, and oil from press liquor. It has aided in the processing of citrus oils . . . these, and many other jobs, have been done faster and better by centrifugal force applied in the proper De Laval machine.

Perhaps you, too, can do likewise. Most new applications are uncovered by cooperative efforts with far-seeing chemical engineers who investigate the possibilities latent in De Laval Centrifugal Force.

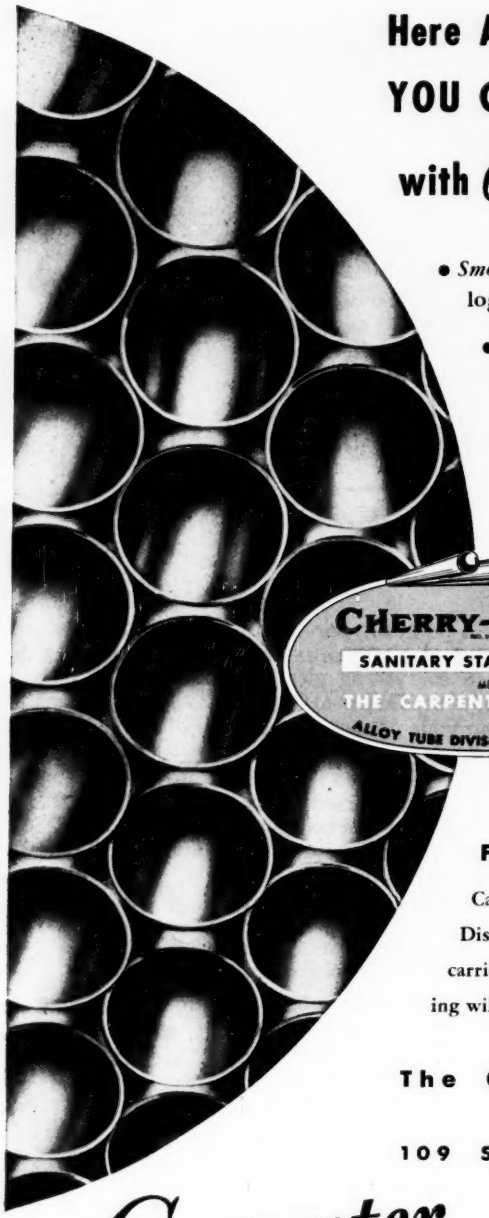


De Laval Centrifugal Separator

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

DE LAVAL CONTINUOUS CENTRIFUGAL PROCESSING

SEPARATION · CLARIFICATION · CONCENTRATION



Here Are the Reasons Why YOU CAN REDUCE PROCESS COSTS with *Carpenter* Stainless Tubing . . .

- *Smooth I.D. Surfaces* reduce the danger of bacteriological or other contamination.
- *Positive Corrosion Resistance* for longer life of equipment and pipe lines.
- *Easy Fabrication* and assembly because of uniform wall thickness throughout each length of tubing.

It pays to look for this label when you buy Sanitary Stainless Tubing!

For Fast Shipment of Your Order . . .

Call your nearest Cherry-Burrell Branch or Associated Distributor and take advantage of the large warehouse stocks carried throughout the U. S. A. Your Sanitary Stainless Tubing will be in your plant when you want it.

The CARPENTER STEEL COMPANY
Alloy Tube Division
109 Springfield Road, Union, N. J.

Carpenter

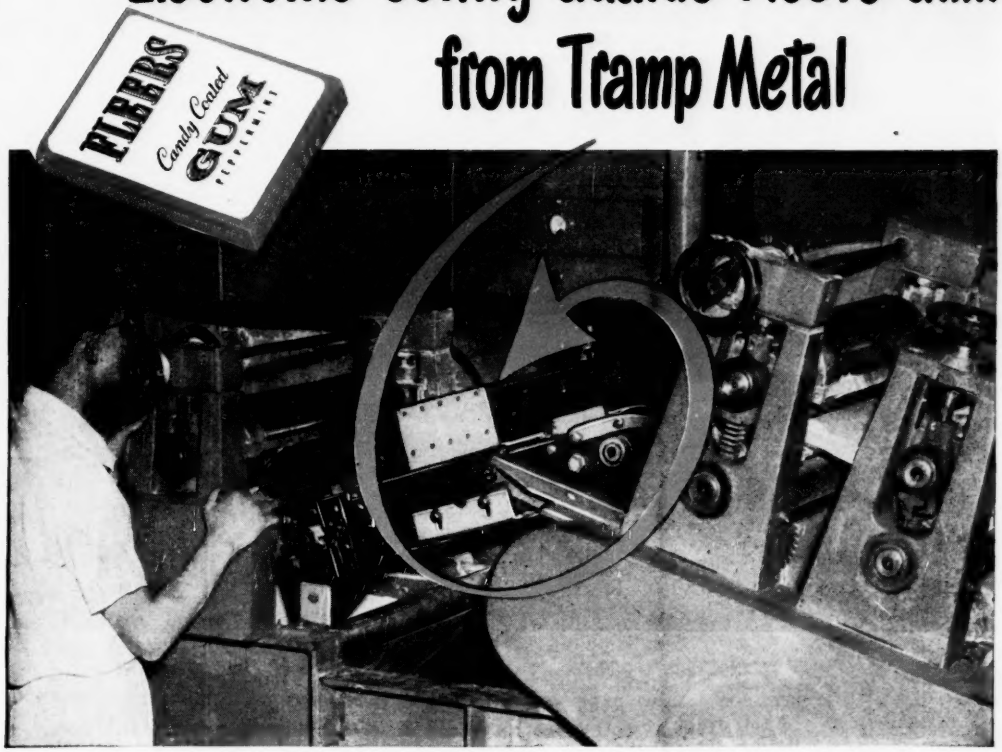
SANITARY

more than corrosion resistance

STAINLESS TUBING

AVAILABLE FROM CHERRY-BURRELL WAREHOUSE STOCKS THROUGHOUT THE U. S. A.

Electronic Sentry Guards Fleers Gum from Tramp Metal



Allis-Chalmers Metal Detectors Provide Constant Product Inspection

THE FRANK H. FLEER CORPORATION, Philadelphia, knows that purity is essential to its product. As a result, A-C Metal Detectors stand watch over its production line . . . protecting against metal contamination . . . assuring customer good will.

Manufacturers of food, plastics, tobacco, rubber, and many other products, use A-C Metal Detectors as insurance against machinery damage and loss of production time. One installation, in a plastic processing plant, paid for itself the *first* day of operation by preventing damage to calender rolls.

Allis-Chalmers Metal Detectors will spot magnetic or non-magnetic particles as small as .039 in. in diameter, regardless of how deeply imbedded they are. If you're interested in their possible application in your plant, contact our representative in your nearby A-C office, or write direct.

**The Metal Detector was developed by RCA Victor. Now, however, RCA's high frequency heating and metal detection equipment has been added to the Allis-Chalmers line. Thus, the combined electronic experience of two great companies is available to serve industry.*

ALLIS-CHALMERS, 1113A SO. 70 ST. MILWAUKEE, WIS. A 2557

Please send me more information on:

☐ METAL DETECTORS
Protect product quality and machinery. 2, 4, 7, 12 in. apertures.

☐ INDUCTION HEATERS
Brazing, soldering, hardening, annealing. 1 through 200 kw.

☐ DIELECTRIC HEATERS
Wood, plastics, textiles, sand cores. 100 w through 125 kw.

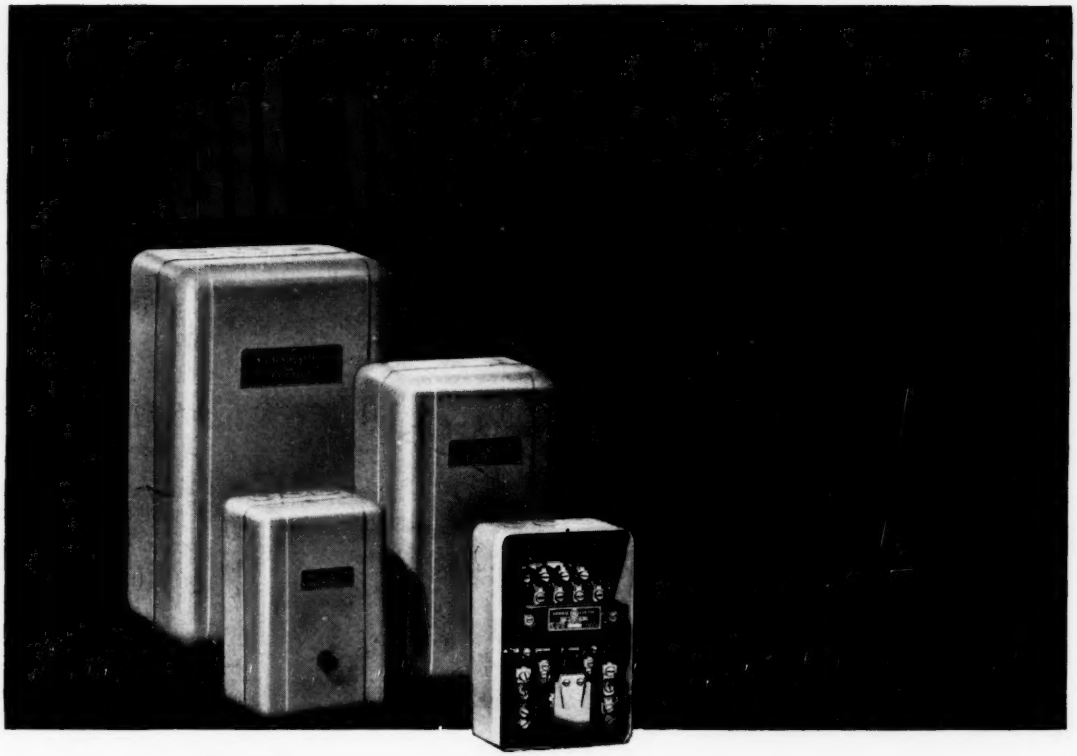
Name.....

Company.....

Address.....

City.....State.....

ALLIS-CHALMERS
ELECTRONIC HEATERS AND METAL DETECTORS FOR INDUSTRY



MOTOR STARTERS

MADE FOR EXTRA LONG LIFE, GREATER FLEXIBILITY!

They're here—G-E magnetic motor starters in a complete all-new line! Here are all the best features, all the popular sizes. See for yourself what makes these starters ideal for control of your food plant motors. Check for yourself advantages such as these:

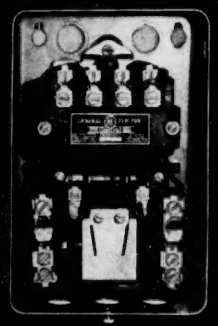
Extra long life New, 'Strongbox' magnet coil, locked in a tough plastic block, protects windings against shorts caused by moisture-filled grain dust or food particles, against damage from slipping screwdrivers during wiring. Silver contacts are made to take millions of operations. New magnet construction gives quick, positive, "make-and-break" contact.

Greater flexibility Main poles up to NEMA size 1—and interlocks in all sizes up to 3—can be changed from normally open to normally closed with no extra parts needed. A finger flip changes the overload relays from hand to automatic reset. Contacts can be quickly exposed for inspection, and replaced if necessary without disturbing wiring, for easier maintenance.

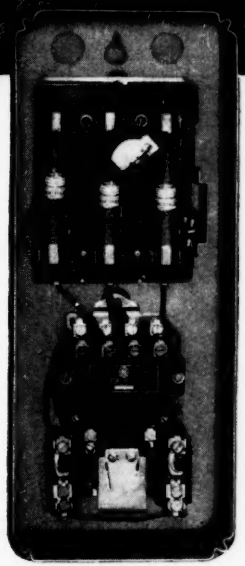
These new, improved motor starters are available now for induction motors up to 50 hp, which covers most food plant drive needs. Get all the facts. Send for the informative new bulletins listed in coupon. ***Apparatus Department, General Electric Company, Schenectady 5, N. Y.***

GENERAL ELECTRIC

653-38



Note the convenience features of the new G-E motor starter. Shallow case, front-located terminals, easy-working terminal clamps, large pan-head screws, handy knockouts—these all help simplify and speed wiring.



See how the new G-E *combination starter* saves food plant space and simplifies installation. In addition to the starter with its motor-protecting overload relays, it includes in one single, compact unit a new, rotary-action fused disconnect switch for circuit isolation and short circuit protection, required by N.E.C.

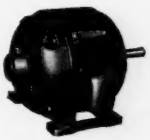
Team up these starters with

TRI/CLAD

REG. U.S. PAT. OFF.

FOOD PLANT MOTORS!

The new G-E line of motor starters makes a worthy partner for the famous G-E Tri-Clad motor family. Used together, they'll help eliminate costly breakdowns that hold up a food processing line, cause lost production and spoilage of foods in process. Tri-Clad motors, at no extra cost, provide three-fold extra protection against physical damage, against electrical breakdown, against operating wear and tear. Here are a few Tri-Clad motor types widely used in food plants:



Tri-Clad Open Drippproof Motor A reputation for on-the-job dependability identifies this general-purpose "workhorse" motor. Vital parts are protected against dripping liquids, falling objects, external blows. See Bulletin GEA-3580.

Tri-Clad Totally Enclosed Non-ventilated Motor Sealed to keep out food particles, liquids, and splashings from frequent hosings, this motor is a "natural" for use in breweries, canneries, dairies, bottling works, ice-cream works. See Bulletin GEA-4082.

Tri-Clad ACA Adjustable-speed Motor Filling the needs of over two-thirds of all food plants using adjustable-speed drives, this a-c motor provides stepless speed adjustment with fingertip control over speed ranges 3:1, 6:1, and 20:1 on ovens, pumps, conveyors, etc. See Bulletin GEA-4883.

Tri-Clad Gear-motor On reduced speed drives, this compact motor saves space and maintenance by eliminating the need for mechanical couplings and speed reducers. Gears are sealed in the motor, with no dripping oil to mess up floors. See Bulletin GEA-1437.

WANT MORE DATA?

General Electric Company, Section 653-38
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

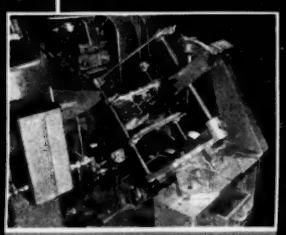
- ..... GEA-1437—Gear motors
- ..... GEA-3580—Open drippproof motors
- ..... GEA-4082—Totally enclosed motors
- ..... GEA-4883—ACA motors
- ..... GEA-5153—A-c motor starters
- ..... GEA-5156—Combination a-c starters

Name.....

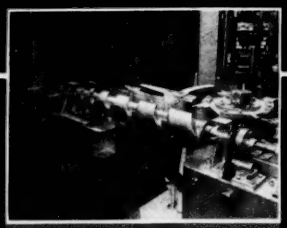
Company.....

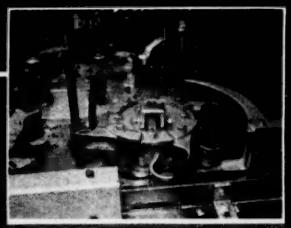
Street.....

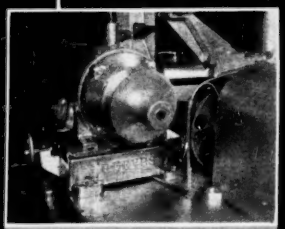
City..... State.....



Label holders and gumming mechanism arranged for easy refilling during operation.







Reeves variable speed drive insures accurate synchronization with other equipment in the line.

Designed and Built to Give You DEPENDABLE OPERATION . . .

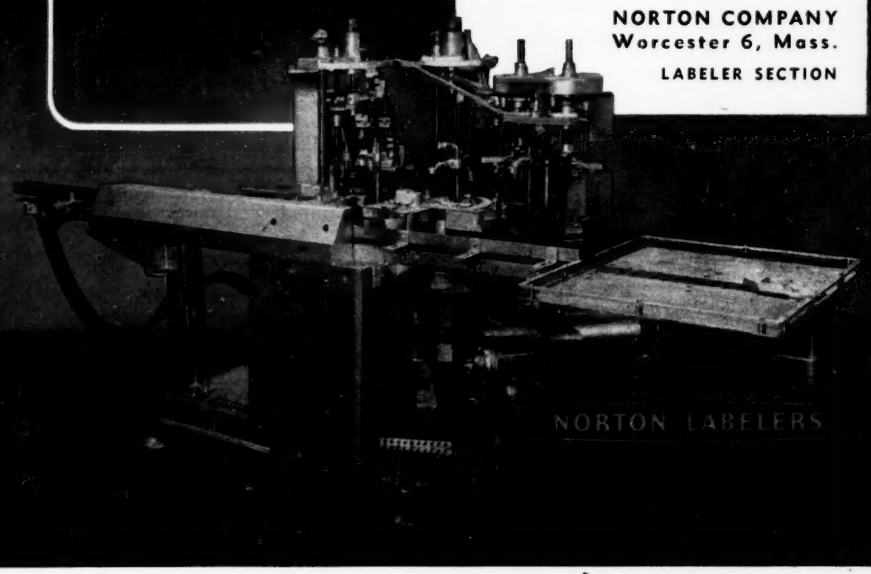
NORTON LABELERS

DESIGNED to give your bottle or jar a smooth, easy ride — designed to apply your labels neatly and firmly — and designed to do this hour after hour, day after day, month after month without costly maintenance expense . . . that's the NORTON Labeler.

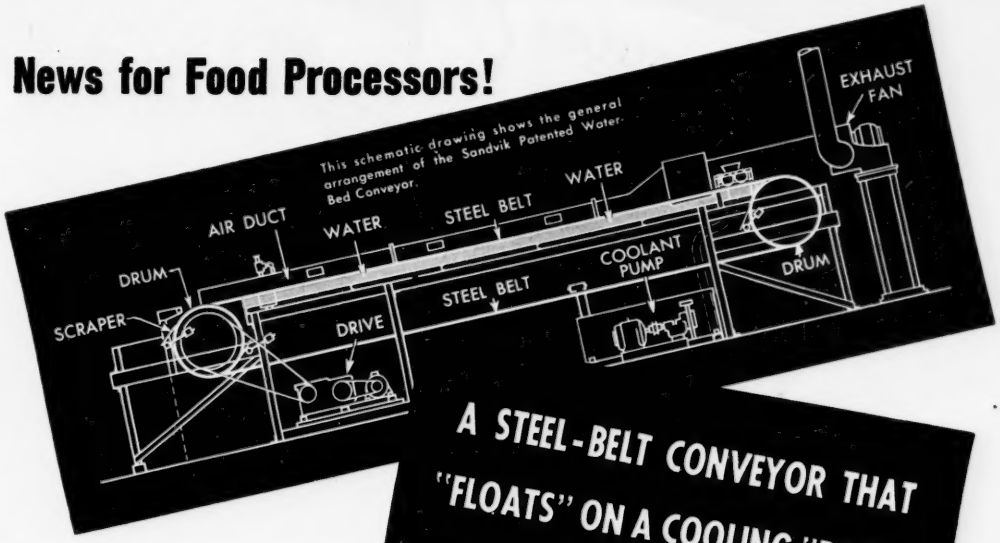
Here you'll find combined in one machine the many years' experience of the Oslund organization in designing and building labeling machines plus the 48 years' experience of Norton in designing and building precision grinders.

Complete catalogs on both the Norton Single and the Norton Duplex Labeler on request — no obligation.

NORTON COMPANY
Worcester 6, Mass.
LABELER SECTION



News for Food Processors!



A STEEL-BELT CONVEYOR THAT "FLOATS" ON A COOLING "RIVER"

For Cooling Candy, Margarine, Gelatin, Pitch, Grease, Synthetic Resin, Meta-Silicate of Soda and for Heating, Cooling or Flaking many other Food Products and Chemicals.

The new Sandvik Patented Water-Bed Conveyor carries your product on a solid, stainless, steel belt that is actually supported by water.

The top band of the continuous belt passes over a trough of circulating water. In operation, the water pressure is just enough to raise the belt off its supports. The surplus water overflows into gutters which collect and return the water for recirculation.

That means 100% coolant contact with the underside of the belt. Furthermore the entire conveying band runs in an air conditioned "tunnel" . . . a metal duct through which a suction fan pulls a continuous draught of clean, cool air. You get tremendous cooling capacity plus the strength, impermeability and resistance to heat, wear and corrosion inherent in the stainless steel belt.

Tapered neoprene strips fitted to the edges of the flat, stainless belt hold the liquid material on the belt surface.

The width and length of the belt, speed of operation, temperature of the cooling or heating medium etc. all depend, of course, on the requirements of the individual application.

Sandvik can design and build a steel-belt conveyor, with or without the Patented Water-bed arrangement, to fit your specific needs. Write for further information.

SS-36

SANDVIK STEEL BELT CONVEYORS

SANDVIK STEEL, INC.,
Conveyor Department
111 Eighth Ave., New York 11, N. Y., WAtkins 9-7180
Manufacturers of Steel-Belt Conveyors for over 30 years

See Our Catalog in Sweets

Investigate
Staley's GLUTAMATE
99+% Pure MONOSODIUM GLUTAMATE
More and more famous food processors are using monosodium glutamate to enhance and maintain the full, natural flavor of their products. Staley's GLUTAMATE is 99+% pure monosodium glutamate—manufactured by a company known for over half a century in the food field for the high quality of its products.

A.E. Staley Mfg. Co. *Announces* the for the exclusive

Staley's GLUTAMATE

99+% PURE MONOSODIUM GLUTAMATE

AS SIMPLE TO USE AS SALT!

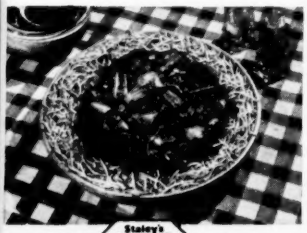
NO BASIC FORMULA CHANGES NECESSARY

Do not confuse Staley's GLUTAMATE with flavoring agents, spices, or normally used seasoning material. GLUTAMATE does not flavor foods. It intensifies natural flavor of many foods—even when foods are subjected to high cooking or canning temperatures. Staley's GLUTAMATE emphasizes and strengthens natural flavors already present in food products.

If you are already using monosodium glutamate, you are urged to consider the merits of Staley's 99+% pure product. Uniformity, purity and dependability of supply assured because Staley's GLUTAMATE is produced under the most exacting laboratory supervision in one of America's newest and most modern food processing plants.

If you are not using monosodium glutamate now, you owe it to yourself to discover what Staley's GLUTAMATE can do for your products.

A. E. STALEY MANUFACTURING CO.
DECATUR, ILLINOIS



TRY Staley's GLUTAMATE *in chop suey–chow mein*

TRY Staley's GLUTAMATE *in liquid or dehydrated soups*

TRY Staley's GLUTAMATE *in sausage, meat loaf*

TRY Staley's GLUTAMATE

completion of a new $2,500,000 plant production of Staley's GLUTAMATE!

STALEY'S NEW 99+% PURE MONOSODIUM GLUTAMATE

MONOSODIUM glutamate, and its amazing property of "bringing out" the flavor of many foods, makes it the most "talked-of" ingredient in recent food technology.

Meat and fish packers, vegetable canners, processors of prepared soup, restaurant operators—give generous praise to the flavor-enhancing results produced by this exciting new food product.

Staley's GLUTAMATE Is Dependable Uniform 99+% Pure

Every food processor is constantly concerned about quality control. In the selection of ingredients QUALITY and UNIFORMITY are always of prime importance.

That is why, when Staley decided to produce monosodium glutamate it took no "short cuts." Every move, from pilot-plant testing to full-scale production, was designed to assure maximum efficiency of operation and absolute dependability of product.

Staley's GLUTAMATE is a free-flowing granular material resembling coarse table salt or fine granulated sugar in appearance. Individual crystals are transparent and colorless, density of which is about 1.7 compared to water having density of 1.0. A 5% water solution has a pH value of 6.8. A very small amount is required for maximum effectiveness. Range of use for most products is from 0.05% to 0.5% of the weight of the food.

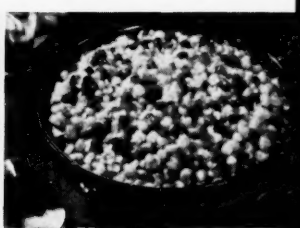
Try Staley's GLUTAMATE. Complete descriptive literature and the services of our technical staff are yours for the asking.

A. E. STALEY MANUFACTURING COMPANY
DECATUR, ILL.

in processed or frozen fish

TRY Staley's GLUTAMATE *in stews or chowder*

TRY Staley's GLUTAMATE *in processed or frozen meats*



TRY Staley's GLUTAMATE *in processed or frozen vegetables*

FOR 1949

PUT THE PLUS IN YOUR PROCESS!*

by Standardizing on

HEYDEN CHEMICALS

IMPORTANT IN THE PRODUCTION OF FOOD PRODUCTS

SODIUM BENZOATE U.S.P. — A standard preservative of food quality, flavor and color. Available as powder, granules or flakes. Shipped in 100 lb. bbls.; 50 and 25 lb. fiber drums.

BENZOIC ACID — Widely used as a preserving agent. Shipped in 100 lb. bbls.; 50 and 25 lb. fiber drums.

BENZALDEHYDE N.F. — Synthetic oil of bitter almonds. For flavoring and aroma in canned fruits, fruit beverages, cake mixes, candies. Shipped in 425 lb. drums, 100 lb. carboys, and 50 and 25 lb. boxed tins.

METHYL SALICYLATE U.S.P. — Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. boxed tins.

Technical literature and samples mailed promptly upon request on company letterhead.

*THE PLUS IN YOUR PROCESS

- . . . Constant source of supply.
- . . . Production control through uniformity.
- . . . Exacting specifications . . . assured quality.
- . . . Extensive facilities of 5 modern plants.

Serving Industry through Finer Chemicals

HEYDEN CHEMICAL CORPORATION

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

CHICAGO 6: 20 North Wacker Drive • PHILADELPHIA 3: 1700 Walnut Street

SAN FRANCISCO 11: 420 Market Street

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FINE HEYDEN CHEMICALS

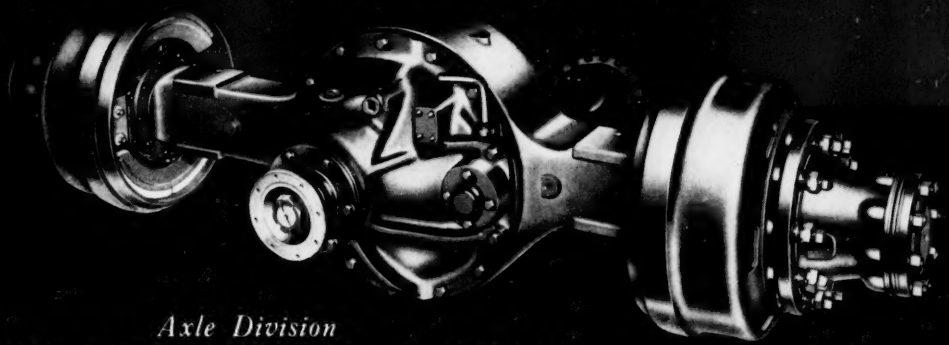
Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Chlorobenzenes • Creosotes • Formates
Formaldehyde • Formic Acid • Glycerophosphates • Guaiacols • Hexamethylenetetramine • M. D. A. (Methylene Disalicylic Acid)
Paraformaldehyde • Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates • Salicylic Acid • Streptomycin

High-balling Down the Main Pike or Pulling Out of the Tough Spots

EATON AXLES

. . . give you the *exactly-right* gear ratio for every road, load, and type of service. There is no need to sacrifice speed for power—or power for speed. Eaton gives you BOTH—in the same vehicle with the same axle, available at finger touch to meet every specific operating need. And Eaton Axles actually pay for themselves, because they permit engines to operate at most efficient and economical speeds, reduce stress and wear on the entire vehicle, hold operating and upkeep costs to a minimum —and add miles to vehicle life. Eaton 2-Speed Axles are available for most trucks of the 1½ ton class and larger. See your truck dealer.

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

OTHER EATON PRODUCTS

SODIUM COOLED VALVES • POPPET VALVES • FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • PERMANENT MOLD GRAY IRON CASTINGS • ROTOR PUMPS
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IT PAYS TO

Check with CONTINENTAL

- Next to the products you pack, there's nothing more important than the cans you pack them in.
- That's why we think it's such sound business for you to check with Continental before making any decision affecting your supply of cans.
- It costs nothing to talk things over and . . .
- We may be in a position, because of our size and flexibility, to assure you a dependable supply.
- We may be able to give you faster service.
- We may be able to save you money by suggesting a change in your processing operations.
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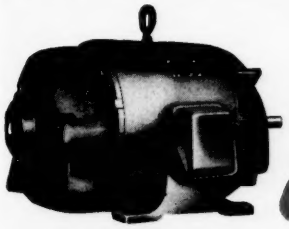
- Why not "Check with Continental" today?

CONTINENTAL CAN COMPANY

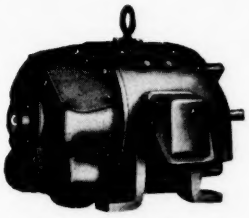
100 EAST 42nd STREET, NEW YORK 17, N. Y.

Wherever Splashing Liquids Create a Hazard...

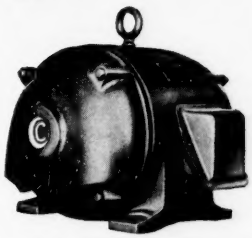
Specify a Century SPLASH PROOF Motor



Century 7½ HP type RS Repulsion Start Induction Brush Lifting Splash Proof Motor

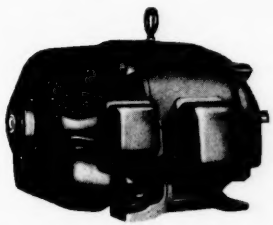


1 to 7½ HP Direct Current Splash Proof Motor

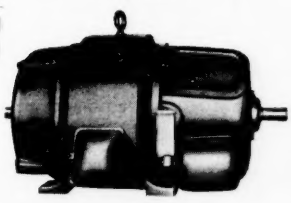


1 to 30 HP Squirrel Cage Induction 3 Phase Splash Proof Motors

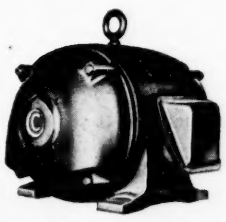
40 to 100 HP Squirrel Cage Induction 3 Phase Splash Proof Motors



3 to 25 HP Slip Ring Induction 3 Phase Splash Proof Motors



30 to 100 HP Slip Ring Induction 3 Phase Splash Proof Motors



1 to 20 HP Capacitor Start Induction Single Phase Splash Proof Motor

Century Splash Proof motor frames keep the vital parts of the motor dry—even when the full force of water from a hose is turned directly on it.

Century Splash Proof motors may help to protect the reputation of the machines you build through the protection provided in their construction—against splashing liquids, plant wash downs or falling solids.

Century Splash Proof motors are available in a wide range of types and sizes and electrical characteristics for all popular applications.

In addition, Century builds a complete line of various types of electric motors in sizes from 1/6 to 400 horsepower. Popular types and ratings are available from factory and branch office stocks.

Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO.
1806 Pine Street
St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

Century C MOTORS

595

Regardless of weather or roads, motor trucks pick up and deliver most motion picture film at night to make it available for the next day's showing.

Midnight on Main Street

There are no alibis in the motion picture film delivery business. The "show must go on" seven days a week, twelve months a year . . . delay in the arrival of new film means disgruntled customers and lost revenue.

One film distributing firm operates 153 trucks more than 24,000 miles a day, serving 1215 theatres in nine different states. And there are many more GMC trucks in this fleet than any other make.

When you want reliable motor transport service . . . for any other type of company or commodity . . . GMC's day-in-and-day-out dependability really pays off.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

In the GMC line there are models for every food hauling need . . . pickups, stakes, tractors and chassis units for special bodies . . . in a variety of wheelbases and equipment options . . . with seven gasoline and two Diesel engines capable of handling gross combination weights from 4,600 to 90,000 pounds.

THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE • DIESEL

For BETTER TEMPERATURE CONTROL

GET A COPY OF NEW BULLETIN 329

It will help make it easy for you to select the simplest, most dependable type of control made for many of the following applications:

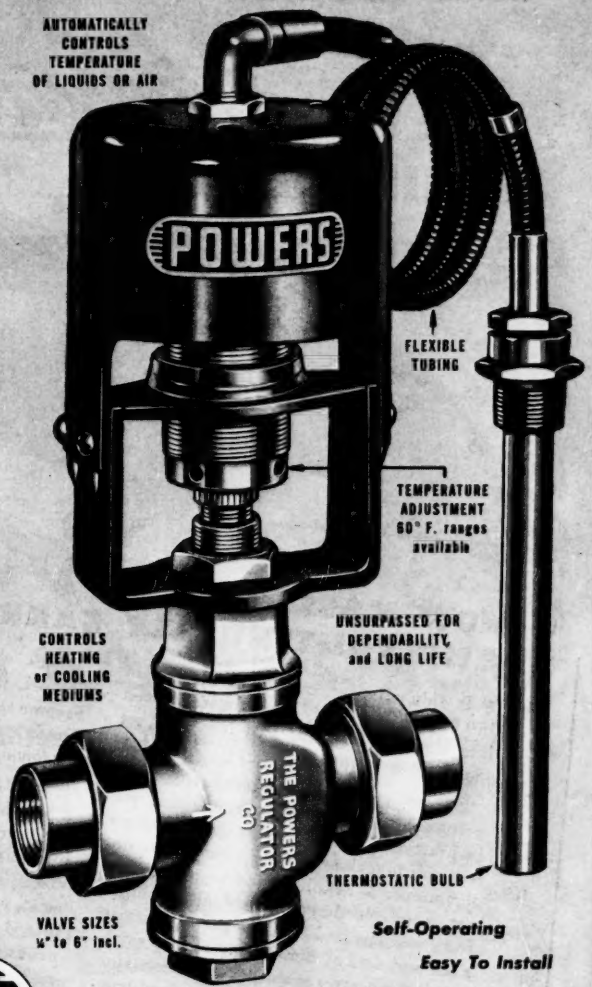
Water Heaters • Hot Water Line Control • Cooking Vats Tanks • Kettles • Dryers • Pasteurizers • Blanchers Stills • Bottle and Can Washers • Smoke Houses Sausage Cooking and Steaming Cabinets • Dough Rooms and Proof Boxes — and many other uses (11DF)

Quickly Pay Back Their Cost

Controlling heating operations they prevent OVER heating—save fuel and labor—improve production

Controlling cooling water for diesel, gas engines and compressors they help prevent OVER and UNDER cooling—increase operating efficiency and reduce con sumption of cooling water

TYPES AVAILABLE: Direct and reverse acting regulators—**Double Seat balanced valve,** double unions ½" to 2" incl., flanged 2½" to 6" incl.—**Single Seat** valve double unions ¼" to 1½" incl.—**3-Way valve** ½" to 4" incl.—**Temperature Indicating regulator**—all are shown in new Bulletin 329. Get a copy and prices from our nearest office.



Use

POWERS

No. 11 INDICATING REGULATOR

Combining an easy to read dial thermometer with a self operating regulator was pioneered by POWERS in 1930. Thermometer has a 4" dial and is mounted on top of the regulator. Both thermometer and regulator operate from same thermal system. Only one tapped opening required. A visual check on performance of the regulator is provided and it is easy to adjust for different temperatures.

No. 11 REGULATORS

When you want a simple, rugged control to maintain a constant temperature with unfailing dependability . . . install a POWERS regulator. They often give 10 to 25 years of service and pay back their cost several times a year. No compressed air or electricity required. May be just the regulator to solve some of your temperature control problems. ***Write for Bulletin 329.***

CHICAGO 14, ILL. 2720 Greenview Ave. Phone BUckingham 1-7100
NEW YORK 17, N. Y. 231 East 46th St. Phone ELdorado 5-2050
LOS ANGELES 5, CAL. 1808 West Eighth St. Phone Drexel 2394
TORONTO, ONT. 195 Spadina Ave. Phone Adelaide 6257

THE POWERS REGULATOR CO.

OFFICES IN 50 CITIES • SEE YOUR PHONE BOOK

*Over **55** Years of Temperature and Humidity Control*

THE WORLD'S *Most Versatile* EXCHANGER

NOW MASS-PRODUCED AT LOW UNIT COST AND CONTINUALLY CARRIED IN STOCK

● It didn't happen overnight. More than 150,000 Ross "BCF" Exchangers, placed into service during the past few years, *set the pattern.*

For, with such a large number of units doing a cooling, heating or condensing job in practically every type of industry, Ross was able to make thoroughly conclusive observations. A definite trend became apparent in the selection of individual assemblies from standardized "BCF" parts. Thirteen sizes and sets of dimensions clearly established themselves as the needs of the majority, as did certain refinements in construction and advancements in thermal engineering gained through practical observations in the field.

Thus, with the will of the majority expressed, these most-wanted features have become standardized in the *new "BCF" All-Nonferrous Exchanger, now mass-produced for low unit cost, and continually stocked at the Ross plant for prompt shipment.*

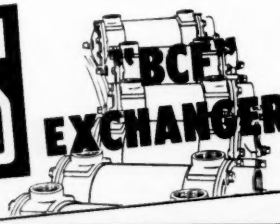
So whether you're a builder of primary equipment, furnishing exchangers with your units as original accessories, or whether you're an actual user of heat transfer equipment, you can be sure of more BTUs transferred per dollar invested with a mass-produced "BCF" than with any other exchanger.

★NEW BOOKLET—*FREE*
Eight pages illustrate and summarize your benefits from the new "BCF". Ask for Bulletin 1.1K1 on your letterhead.

Ross Heater & Mfg. Co., Inc.
Division of American Radiator & Standard Sanitary Corporation
1443 WEST AVE. BUFFALO 13, N. Y.

In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

ROSS "BCF" EXCHANGERS



Serving home and industry

AMERICAN STANDARD • AMERICAN SHOWER • [illegible] • TONAWANDA, N.Y.

AS NEAR AS YOUR TELEPHONE

A new V-Belt service by Dayton, to save you time and money three ways:

1. "Drive Proved" V-Belts—the right belt for your particular drive. For Dayton has made more than 100 million V-Belts. They have been "Drive Proved" in every kind of industry, under every possible operating condition of heat, cold, dirt, dust and oil. They have proved their ability to save space; provide positive power; start and stop smoothly; run quietly, without vibration and last longer than any ordinary belt.

2. As Near as Your Telephone. There is a Dayton V-Belt Distributor near you. He is equipped with the specialized knowledge to recommend the right drive for you. You'll find him listed in the classified section of your telephone directory or his representative is now calling at your plant.

3. Instant Maintenance Service from Local Stocks. Your Dayton Distributor maintains complete stocks of Dayton "Drive Proved" V-Belts and pulleys. He is prepared to give you instant service for existing or future drives, and to provide you with an immediate source of mill supplies.

Put this new service to work in your plant now. Equip your drives with Dayton "Drive Proved" V-Belts and be sure you are getting the maximum in drive performance and service. Call your Dayton V-Belt Distributor today. *The Dayton Rubber Company, Dayton, Ohio.*

ONLY Dayton V-Belts are "DRIVE PROVED" for the Job!

Dayton Thorobred—for normal and heavy duty drives.
Dayton FHP—for small machines and appliances.
Dayton Cog—for shortest centers, smallest pulleys.
Dayton Steel Cable—for extreme loads and speeds.

ALL STOCKED BY YOUR LOCAL DAYTON V-BELT DISTRIBUTOR

Dayton Rubber

1. Look where the groceries grow!

The American farmer is the world's biggest user of trucks. He depends on reliable, low-cost hauling . . . so he uses thousands of International Trucks.

2. Look at the meat fleet!

Many of the trucks that keep meat moving mouthward are International Trucks. They are designed, engineered and built for this particular job by a company that has been building trucks for 42 years.

3. Look how the canning is coming!

A gigantic network of trucking systems places plenty-of-million cans on grocers' shelves.

Many of the trucks in those systems are International Trucks—specialized trucks built to do specialized jobs.

4. Look how the bread rolls!

Families count on daily delivery of the staff of life.

Leading bakeries count on the International-Metro, too. They find that this multi-stop delivery truck slices delivery costs-per-loaf, helps drivers.

It's millions of miles from markets to mouths...

5. So think how many meals-an-hour trucks like this must travel!

Millions eat good food every day only because American industry and commerce pitch in to keep the calories coming.

Our part in that picture is—TRUCKS. All kinds. There are 22 basic International Trucks. There are different engines (gasoline, diesel and butane), wheelbases, axles, transmissions and other components for efficient specialization-of-truck-to-job. Gross weight ratings range from 4,400 to 90,000 lbs.

For trucks to haul food, for trucks to haul *anything*, for trucks that are the "Standard of the Highway," see your International Dealer or Branch.

Other International Harvester Products
Farmall Tractors and Machines
Industrial Power . . . Refrigeration

Tune in James Melton and "Harvest of Stars," CBS, Wednesday evenings

INTERNATIONAL INTERNATIONAL **TRUCKS**

INTERNATIONAL HARVESTER COMPANY · CHICAGO

In-Plant Chlorination **Stretches** Production Hours

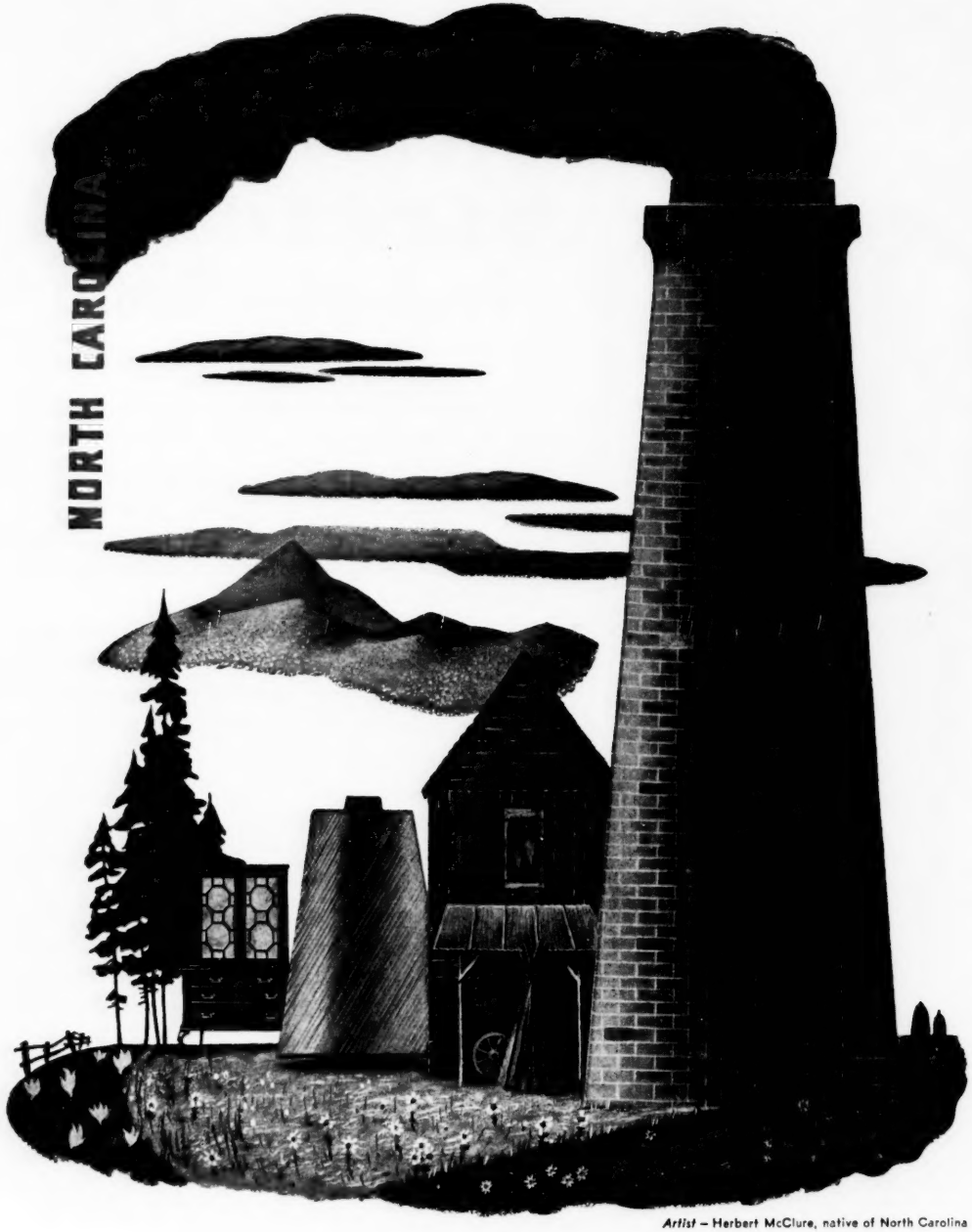
Faced with rising costs all along the line, smart food plant operators are looking for ways to increase production efficiency while maintaining or increasing product quality. That's why we think you'll be interested in what In-Plant Break-Point Chlorination is doing in progressive plants throughout the country—in what it *can* do in yours.

Briefly the story is this: In-Plant Chlorination cuts clean-up time as much as 50% by preventing slime accumulations due to bacteria in flumes, washers, pipes and other equipment. It makes the clean-up job easier because of the effective sterilizing action of a free chlorine residual which maintains a greater degree of cleanliness throughout production time. And it protects product quality by eliminating bacteria-induced off odors and flavors.

The complete story is yours for the asking. Why not write today? There's no obligation, and W&T Engineers will be glad to show you how job-engineered, W&T Chlorination backed by over 35 years' experience can help you put more production in each working day.

WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

I-20



Artist – Herbert McClure, native of North Carolina

NORTH CAROLINA – *annual purchases: $2 billion – mostly packaged.*

CONTAINER CORPORATION OF AMERICA

1949

Can Be The Year You Saved Most In Process Production!

BUFLOVAK Equipment leads to economical and profitable Chemical and Food Processing. By maintaining high product quality at low production cost, BUFLOVAK assures you real savings.

Illustrated are some of the BUFLOVAK equipment. The complete line includes Dryers, Evaporators and Processing Equipment for foods and chemicals. Savings are reported by users in plants everywhere. It's advanced engineering plus modernized construction that does the trick. By using BUFLOVAK you, too, can fatten the piggy-bank of profits.

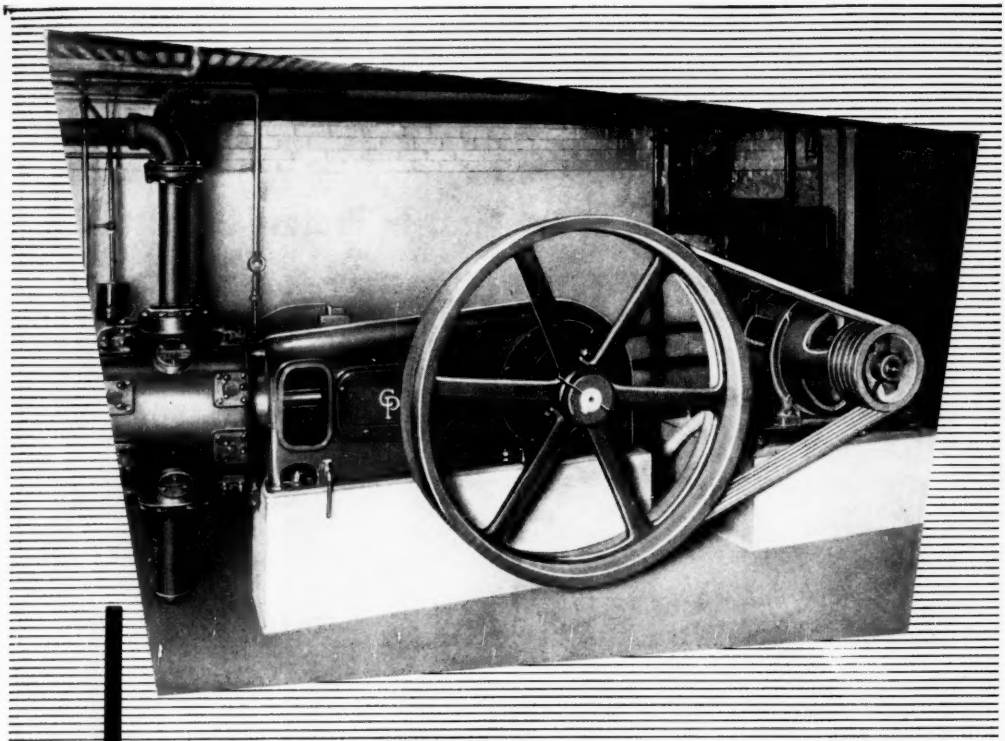
Complete information is available on all the units shown here. We invite you to write today for full data and learn the many exclusive features offered you by BUFLOVAK.

Let us tell you also about our complete and up-to-date Research and Testing Laboratories that can study your processing problems and tell you the complete results of your contemplated process *before* you begin actual operation.

BUFLOVAK EQUIPMENT

Division of Blaw-Knox Co.

1551 FILLMORE AVE. BUFFALO 11, N. Y.



For a dependable and economical air supply

The Type TB horizontal, straight-line, double-acting compressor has proved its dependability through years of satisfactory service. Moderately rated, it can always be counted upon for continuous, economical operation, low maintenance, and long life.

Simplate valves . . . liberally water-jacketed cylinder and heads . . . adjustable, tapered roller main bearings . . . double-counter-weighted crankshaft . . . are some of the CP features that have made it outstanding.

Type TB Compressor is furnished in sizes from 89 to 1937 c.f.m., with V-belt, flat belt, and direct-connected synchronous motor drive. Single and multi-stage designs for pressures up to 5,000 pounds, and steam-driven types are also available.

Write today for Bulletin 728-7.

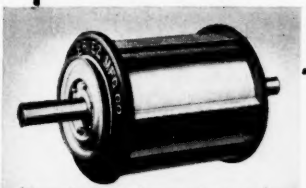
CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

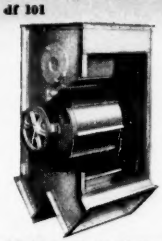
Now! a permanent non-electric magnetic drum separator

Developed by *Eriez*



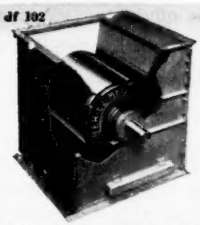
Magnetic drum element above can be ordered separately. Shaft diameters are standard to permit replacement in existing installations without changing bearing or shaft mountings. Ordinarily installed at discharge end of gravity flow chutes, spouts, or other conveyors.

TYPE df 101



Available in a variety of sizes, 12", 18" and 24" diameters. Utilizes a reverse feed which eliminates glancing. Adjustable check gate regulates and evenly feeds material. Shell rotates on shielded precision ball bearings, completely sealed in a dust proof mounting. Unit is fully enclosed, fully automatic and of all metal construction.

TYPE df 102

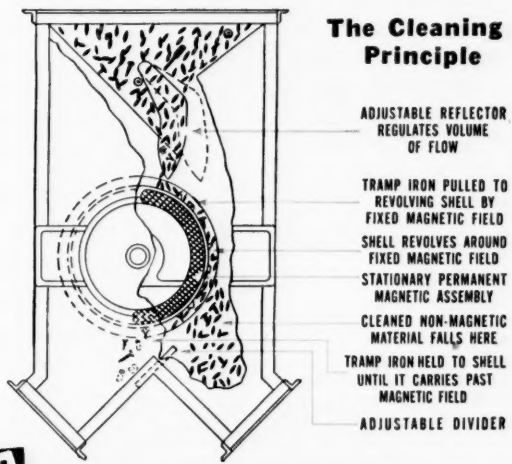


Available in 12" diameter x 14" width. Adaptable for majority of installations. Bearings are same as df 101 drum. Adjustable check gate regulates and evenly feeds material. Drum and housing are furnished ready for installation. Unit is fully enclosed, fully automatic and of all metal construction.

AFTER two years of field testing in every industry, Eriez offers industry this completely new, revolutionary magnetic drum type separator. Self-cleaning, and powered by permanent non-electric magnets, the Eriez separates ferrous materials at far lower cost. There's no operating or maintenance expense . . . no need for current or wiring . . . you get safe, spark-proof reliable magnetic protection right around the clock. There's nothing to get out of order—no attendant electrical accessories . . . the powerful magnetic field of the Eriez is Permanent and magnetic separation is amazingly simple. A look at the diagram below shows how it's done.

AUTOMATIC FERROUS METAL SEPARATION FOR:

Powders	Sand	Minerals
Chemicals	Tobacco	Fertilizers
Grain	Explosives	Metals
Plastics	Crumb Rubber	Textiles



The Cleaning Principle

Pioneer of **PERMANENT** Magnetic Separation

SEE OUR CATALOG IN SWEET'S

Free A new 4 page Bulletin on Magnetic Drums. Write for it today.

ERIEZ MANUFACTURING COMPANY

101 East 12th St. • ERIE, PA.

GAIR DRAMATI[illegible]DS

registered **40** to **250%**

SALES INCREASE

of

7 MINIT PIE-MIX

IN STORE TEST
IN FIVE CITIES

Take your choice 7-MINIT PIES AND CAKE MIXES
7-MINIT CHOCOLATE PIE
7-MINIT COCONUT PIE
7-MINIT LEMON PIE
7-MINIT MAKES PERFECT PIES AND CAKES EVERY TIME!

TWO GAIR COUNTER DISPLAYS were used where the 250% increase took place . . . one at the "check out" point and the other installed close to the shelves stocked with competing mixes. The "check out" location sold out in four hours and then re-stocked . . . the shelf location sold all but two packages the same day.

WHAT GAIR ACCOMPLISHED with this outstanding achievement for 7 MINIT PIE MIX is typical of the effective and efficient service the Robert Gair Organization has been rendering for more than eighty years.

ROBERT GAIR COMPANY, INCORPORATED
NEW YORK · TORONTO
PAPERBOARD · FOLDING CARTONS · SHIPPING CARTONS

It's New!

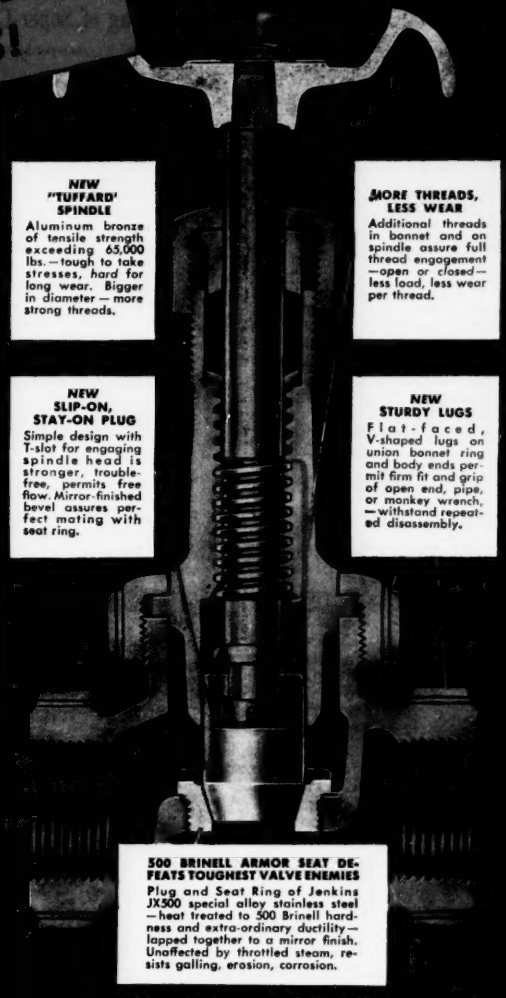
JENKINS ANSWER TO VALVE-KILLING SERVICES!

JENKINS Fig. 976-A

PLUG TYPE

Armor Seat

BRONZE GLOBE VALVE



NEW "TUFFARD" SPINDLE

Aluminum bronze of tensile strength exceeding 65,000 lbs.—tough to take stresses, hard for long wear. Bigger in diameter—more strong threads.

MORE THREADS, LESS WEAR

Additional threads in bonnet and on spindle assure full thread engagement—open or closed—less load, less wear per thread.

NEW SLIP-ON, STAY-ON PLUG

Simple design with T-slot for engaging spindle head is stronger, trouble-free, permits free flow. Mirror-finished bevel assures perfect mating with seat ring.

NEW STURDY LUGS

Flat-faced, V-shaped lugs on union bonnet ring and body ends permit firm fit and grip of open end, pipe, or monkey wrench, —withstand repeated disassembly.

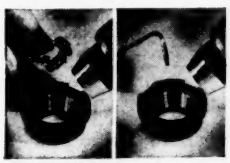
500 BRINELL ARMOR SEAT DEFEATS TOUGHEST VALVE ENEMIES

Plug and Seat Ring of Jenkins JX500 special alloy stainless steel—heat treated to 500 Brinell hardness and extra-ordinary ductility—lapped together to a mirror finish. Unaffected by throttled steam, resists galling, erosion, corrosion.

300 lbs. Steam 600 lbs. O.W.G.

BUILT TO BREAK RECORDS FOR LONG LIFE

Now, for the most severe services, you can choose the new Jenkins Fig. 976-A with complete confidence that it will set new economy records. Use it for pressure regulation, bleeds, drips, and drains, or any close regulation of steam that threatens wire drawing. It will lower maintenance, last longer, where entrapped pipe chips, scale, or rust tubercles are a problem.



SMASHED PIPE CHIPS, WIRE, LEAVE NO SCARS

Steel pipe chips and 1/16" wire rod, with Brinell hardness in excess of 300, were crushed between the new Jenkins JX500 Plug and Seat Ring without leaving a scratch or dent. That's proof of super hardness!

Compare Fig. 976-A, part for part, and see why it's as nearly wear-proof, trouble-proof, and maintenance-free as any stock valve can be. Only a few of the dozen ways it's better are shown here. Get the complete story in the new folder. See why it's unrivalled for endurance and economy, —why it's your best buy in plug-type valves! Use coupon.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

LOOK FOR THIS TRADE JENKINS MARK DIAMOND MARK SINCE 1864

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

GET COMPLETE DETAILS—IN THIS NEW FOLDER

Mail Coupon Today!

JENKINS BROS., 80 WHITE ST., NEW YORK 13

Please send Armor Seat Valve folder—Form 193

Name .....

Company .....

Address .....

FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

Plastics Solution Flow Rate Increased

(reported by J-M Eng. E. J. Weaver)

This chemical company was filtering a highly viscous solution in connection with their plastics production, and was obtaining poor flow rates through the filter.

I suspected that the centrifugal pump they were using in their filter operations was not developing sufficient pressure, and suggested the use of a positive displacement pump instead. With this new pump, I was gratified to learn later that they obtained good clarification and good flow rates on the basis of my suggestion.

$3 Bag of Super-Cel Returns $57.40 Profit!

(reported by J-M Engineer H. G. Martin)

Recently, one of my customers phoned, asking if we could increase their grape pressing yield in gallons of juice and in time saved. If so, they wanted me to show them how to do it.

They place 192 lbs. of Concord grapes in a steam-jacketed cooker, stems and all, with about 1 gal. of water. Steam is applied, and after cooking, the free juice is drained from the bottom.

Before the juice was drained, I added one pound of Hyflo Super-Cel (about ½% by weight of grapes) and stirred it throughout the mass. After a thorough stirring, the mixture was placed in cheese racks under the hydraulic press.

Previously, without Hyflo, the pressing operation had taken 16 minutes. With Hyflo, the press closed completely, producing a dry cake in nine minutes. Instead of requiring a total pressure of 1100 lbs. psi, the press was finished at 600 lbs. psi. There was no slippage of the frames, the cloths cleaned better, and there was no breakage of cloths. In addition to this, the final yield of juice was so much greater that each $3.00 bag of Hyflo used resulted in an overall profit of $57.40.

Needless to say, the use of Hyflo will not stop with the grape presses, but will be standard for all their fruit jelly juices.

Engineering Help Rectifies Filter Problem At Swimming Pool

(reported by J-M Engineer T. A. Fuess)

Here was a new installation of an 80 sq. ft. unit at a municipal swimming pool.

The water was filthy, the pool scummy, and the filter cycle was from 1 to 1½ hours. Inspection of the filter showed a pressure of 40 psi after 30 minutes' operation. The elements were about 50% bare, and clogged with slime. The operator stated that he had precoated with 10 lbs. of Celite Filter Aid, but that the powder would not place itself evenly on the elements.

We cleaned the filter, and removed the slime from the elements by "bumping" the cake off—first by closing the wash outlet, keeping the wash inlet valve open with pump running, and then quickly opening the outlet. About a dozen bumps at 60 psi, with subsequent drains, cleaned up the elements to a fair condition.

We then precoated with 10 lbs. Celite. After fifteen minutes' recirculation a well-formed precoat was obtained. After four hours, the filter was operating at 40 psi under a completely open inlet valve. It appears that their filtration problems are over.

Gets Premium Price for Strawberry Juice Filtered with Celite 545

(reported by J-M Eng. Scott Robbins)

A few months ago, one of my customers purchased a 26 sq. ft. filter to be used in reclaiming syrup used in the treatment of maraschino cherries.

At the particular time the filter arrived, strawberries were in season, and they put it in operation on strawberry juice using Celite 545. The new filter did an excellent job, and they were able to get a premium for this juice from the jelly manufacturer.

In fact, customer was so pleased with the results obtained that they are planning to extend the use of Celite to many of their other operations.

Let Your J-M Engineer Help You With Your Filter Problem

Johns-Manville Filtration Engineers can usually help you solve a filtration problem right on the job, often by suggesting a few simple changes. They may find that a slight change in equipment, operating technique, method of adding filter aid—or a change to another type of filter aid will increase production without affecting filtrate quality. If you are having trouble getting clarity or if your filter station is a "bottleneck," get in touch with your local Johns-Manville representative, or write to Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville JM PRODUCTS

Celite **Filter Aids**

Reg. U. S. Pat. Off.

Specify Thermoid

V-Belt Section

Thorough impregnation of rubber between the cords prevents internal friction.

Thermoid Impregnation Process* Assures Longer V-Belt Life

Thermoid V-Belts are built for the job!

Thermoid V-Belts resist moisture-absorption, and both *internal* and *external* abrasion. Internal abrasion of the cotton cords weakens V-Belts, causing stretch and wear. The Thermoid Impregnation Process assures longer belt life by eliminating internal friction and reducing heat. *And Thermoid V-Belts are pre-stretched to insure perfect operation.*

There are Thermoid V-Belts available to meet *your* requirements.

Your nearest distributor has most sizes in stock for immediate delivery. Through close cooperation with Thermoid field representatives, he can offer quick service on your special V-Belt problems.

It will pay you to ***Specify*** **Thermoid!**

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid
Company

Main Offices and Factory · Trenton, N. J., U. S. A.
Western Offices and Factory · Nephi, Utah, U. S. A.
Industrial Rubber Products
Friction Materials · Oil Field Products

*Thermoid Impregnation Process

The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

FOR LEAKPROOF, TROUBLE-FREE PIPE RUNS

Cut-a-way view of a Walseal Tee showing ring of silver brazed alloy, and completed Silbraz joint.

Specify Walseal* Products

On all types of piping jobs where Type "B" copper or red brass pipe is used, trouble can be avoided by installing Silbraz* joints — made with Walseal valves, fittings and flanges.

Threadless, patented Silbraz joints are silver brazed (not soft soldered) pipe joints that are leakproof, trouble-free — permanent . . . connections that will not creep or pull apart; that literally join with the piping system to form a "one-piece pipe line". Thus, these modern joints eliminate the need for maintenance and costly repairs — especially important where lowered operating costs are imperative.

For complete details on the modern Silbraz joint, made with Walseal products, write for a copy of Walworth Circular 84.

**Patented — Reg. U. S. Patent Office.*

Recommended for

- **Hot and Cold Water Circulating Systems**
- **Boiler Feed Lines**
- **Steam Return Lines**
- **Condensate Lines**
- **Low and High Pressure Air Systems**
- **Lubricating Oil Circulating Systems**
- **Industrial Gas Piping**
- **Solvent and Vacuum Piping Systems**

Make it a "one-piece pipe line" with WALSEAL

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

Increase your Output .. Berlin Chapman PROCESSING MACHINERY

For all Food Products

Every year since 1909 of our continuous operation our plant has grown steadily in personnel and facilities to enable us to keep ahead of the changing requirements of the food processing industry, each year improving Berlin Chapman equipment as our customers' operating conditions made demands for more production. Today into the designing and engineering of Berlin Chapman equipment are reflected those years of experience of both personnel and engineering staff.

BERLIN CHAPMAN PIVOT CHAIN EXHAUST BOX

In this exhaust box there are no transfer devices . . . no place for the cans to crawl, creep or stop . . . every can is exhausted at exactly the same time . . . will handle all cans at any speed without jarring or spilling . . . designed and built in either steam type with the sprays hitting against the side of the can, or water type . . . capacity is unlimited.

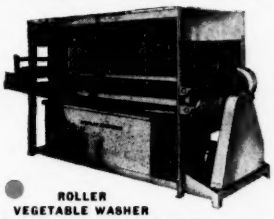
Cook Room Equipment
Retorts
Continuous cookers and coolers
Perforated crates
Hoists

High Speed Juice Equipment
Juice extractors
Juice tanks
Coils
Exhaust boxes

Tomato Processing Machinery
Soak tanks
Rotary washers
Scalders
Roller inspection tables
Peeling tables
Screw type extractors
Heating tanks and coils
Tubular heaters
And special machinery necessary for tomato processing

Corn Processing Equipment
Corn silkers (high speed)
Corn mixers
Double batch corn mixers
And other equipment necessary for corn processing

Pea Processing Equipment
Washers
Blanchers
Picking tables
Separators
Graders
Regraders
Elevators
And all equipment necessary for pea processing

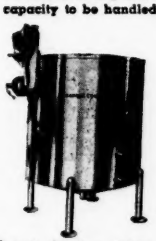


BOX WASHER

A self-contained unit embodying its own relay pump to furnish high pressure washing . . . built to handle any size standard job.

ROLLER VEGETABLE WASHER

Furnished in any size depending upon capacity to be handled.



BRINE JUICE PULP TANKS

Latest design brine, juice and pulp tanks made from all grades of stainless steel, nickel, or Monel metal, depending upon product to be processed . . . regular size from 750 gallons to 2000 gallons capacity.

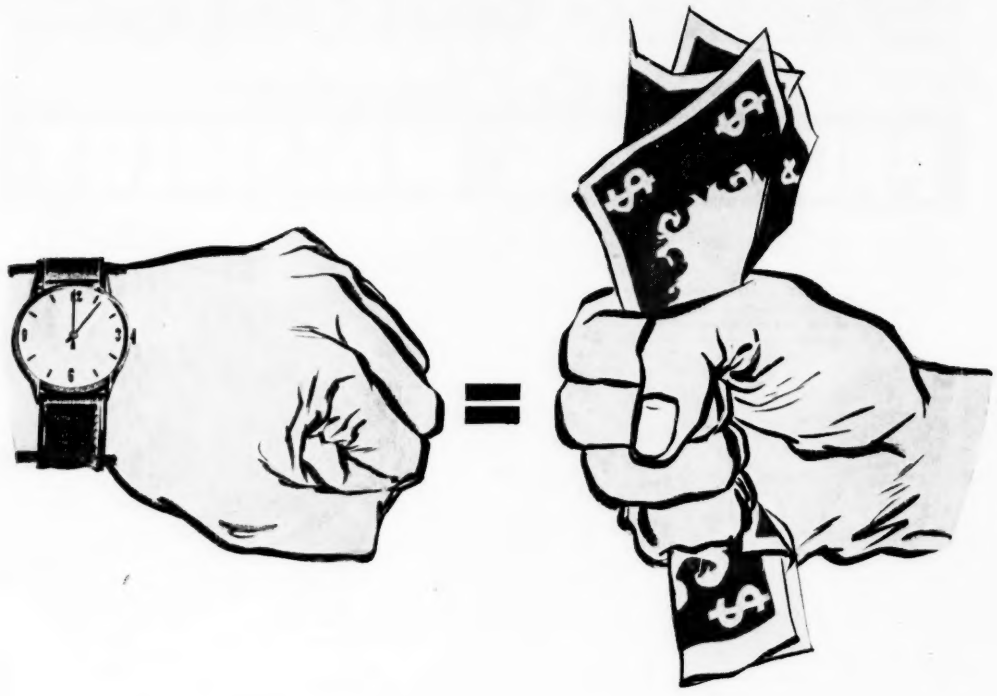
Complete 48 page catalog describing the full line of Berlin Chapman processing machinery for all food products—yours upon request.

BERLIN CHAPMAN COMPANY
Berlin, Wisconsin

SEND NOW

FOR YOUR COPY

Berlin Chapman
Processing Machinery FOR ALL FOOD PRODUCTS



Have you found this out about Time?

Executives have discovered something about Time.

They've discovered that, even in these days of atomic theory and super-mathematics, the old formula is still the same: *Time* equals *Money*.

That's why executives who consider the time-factor as a profit-factor put their products in faster-filling, easier-closing metal containers.

AMERICAN CAN COMPANY

New York · Chicago · San Francisco

This trademark CANCO *is your assurance of quality containers. Look for it!*

Other advantages of the can

1. **Cans are break-proof.**
2. **Cans protect contents against light, air, insects, and moisture.**
3. **Cans are *light*—mean lower shipping costs. *Compact*—mean more storage and display space.**
4. **Cans mean eye-appeal for impulse buying.**
5. **Cans are tamper-proof.**
6. **Cans are easy to open and dispose of.**

TEPCO

SODIUM BENZOATE
U. S. P.

CINNAMIC ALDEHYDE

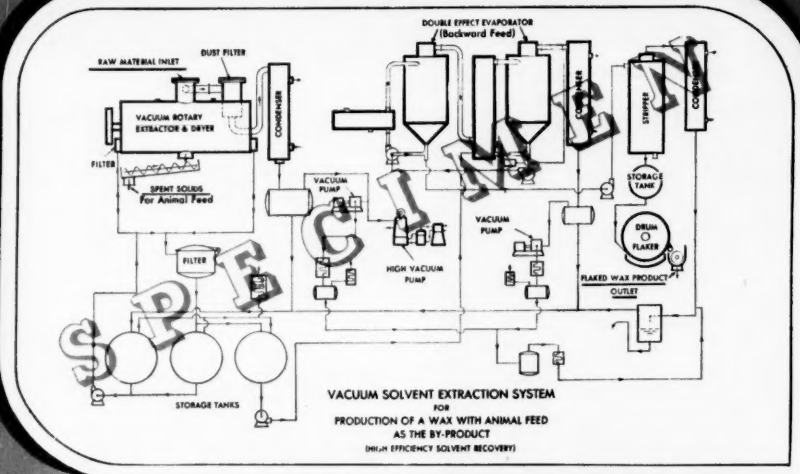
BENZOIC ACID

Tennessee Products & Chemical Corporation

General Office: NASHVILLE, TENNESSEE

Eastern Sales Office: 350 Fifth Avenue, New York 1, N. Y.

ASK STOKES — A Problem-Solving Service for You



VACUUM SOLVENT EXTRACTION SYSTEM
FOR
PRODUCTION OF A WAX WITH ANIMAL FEED
AS THE BY-PRODUCT
(HIGH EFFICIENCY SOLVENT RECOVERY)

MANUFACTURER'S Problem: What can I do with 100 tons of waste that we dump every day from our plant at heavy cost for trucking?

That's the sort of problem that Stokes' engineers like to tackle.

Above you see a simplified Stokes Flowsheet showing a Vacuum Solvent Extraction plant for producing a wax, with animal feed as a salable by-product.

Whether your problem concerns human food or animal feed, Stokes Advisory Service will help solve it.

This service does not merely recommend equipment (though it does that)... nor merely advise on pre-treatment of raw materials (though it does that)...nor merely instruct on how to use equipment (though it does that).

Stokes gives you a complete plan... proved equipment, tested methods, proper installation, instructions to workers, and COSTS...before you invest in the process. F. J. Stokes Machine Company, 5976 Tabor Road, Philadelphia 20, Pennsylvania.

Stokes makes Vacuum and Special Processing equipment, High Vacuum Pumps and Gages, Pharmaceutical equipment, Industrial Tabletting and Powder Metal Presses, Plastics Molding Presses, Water Stills and Special Machinery.

STOKES KNOWS HOW

DISPOSAL OF FOOD WASTES BY GRINDING

Type S-50-A Grinder cross-section above. Many machine at left complete with feed hopper. Capacities up to 5,000 lbs. per hour. Larger size available. Be sure to get this new bulletin on this unit. Write today.

THE JEFFREY MANUFACTURING COMPANY
ESTABLISHED 1877
[illegible] Rush St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

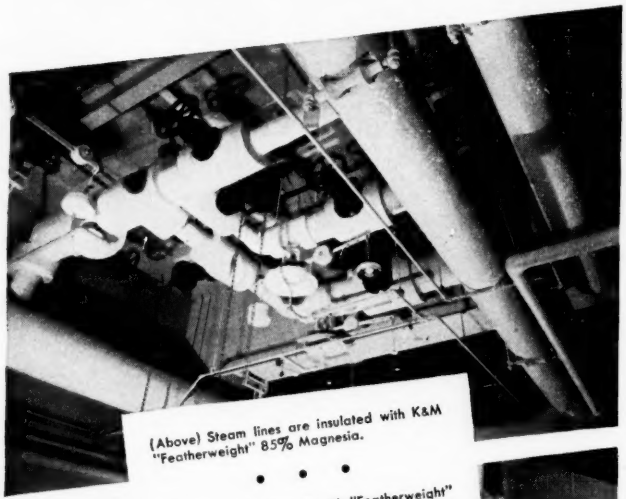
JW

NEW ENGLAND MUTUAL LIFE

holds down overhead costs with

Home Office of New England Mutual Life Insurance Company, Boston, Massachusetts.

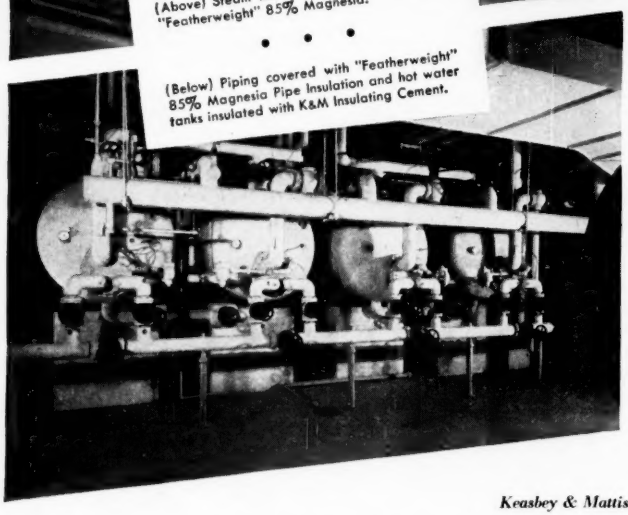
K&M "FEATHERWEIGHT" 85% MAGNESIA INSULATION



(Above) Steam lines are insulated with K&M "Featherweight" 85% Magnesia.

• • •

(Below) Piping covered with "Featherweight" 85% Magnesia Pipe Insulation and hot water tanks insulated with K&M Insulating Cement.



This imposing home office of the New England Mutual Life Insurance Company, Boston, is supplied with heat from a central heating plant.

The steam pipes are insulated with K&M "Featherweight" 85% Magnesia with the net result that heat losses are reduced to a minimum.

"Featherweight" 85% Magnesia insulation, first manufactured by K&M 62 years ago, combines the high insulating properties of basic Carbonate of Magnesia with Asbestos Fibre as a binding agent, forming a featherlight, fireproof, efficient insulating material.

K&M Distributors, located strategically throughout the country, are experts on the application of K&M insulation materials . . . and can point the way to savings for you. Write us for further information.

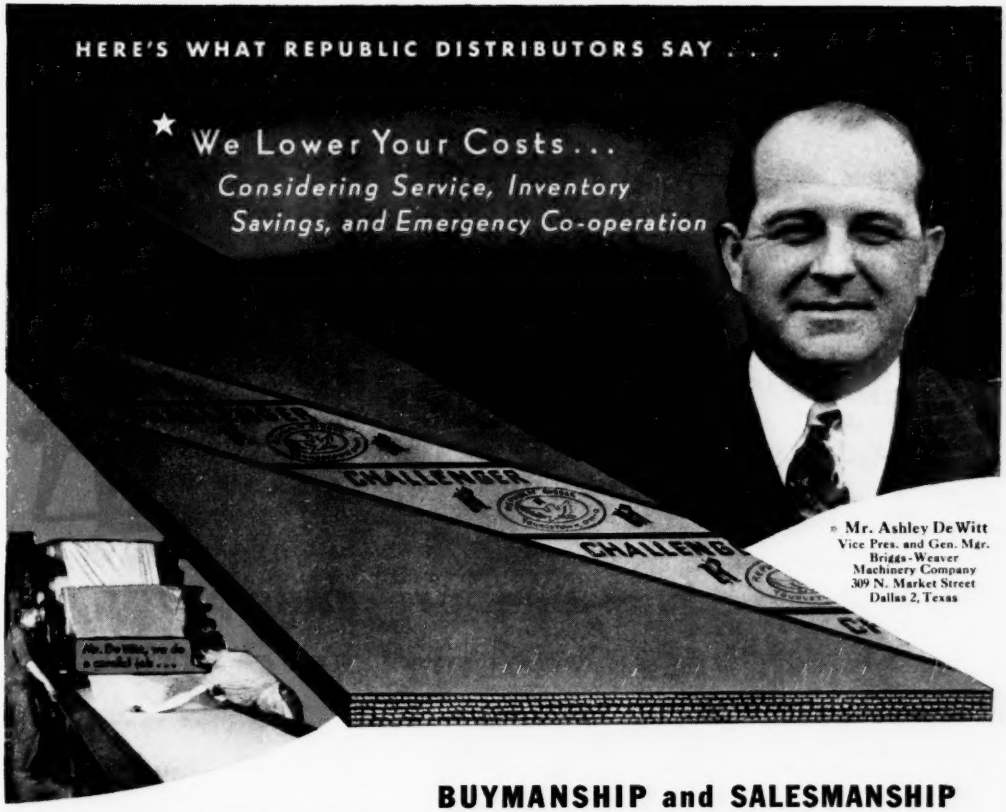
K&M best in asbestos

Nature made Asbestos . . .

Keasbey & Mattison Company has made it serve mankind since 1873.

KEASBEY & MATTISON

COMPANY • AMBLER • PENNSYLVANIA


HERE'S WHAT REPUBLIC DISTRIBUTORS SAY . . .
★ We Lower Your Costs . . .
Considering Service, Inventory Savings, and Emergency Co-operation
CHALLENGER
CHALLENGER

Mr. Ashley DeWitt
Vice Pres. and Gen. Mgr.
Briggs-Weaver Machinery Company
309 N. Market Street
Dallas 2, Texas

In Youngstown, Ohio, and throughout the nation, people have confidence in the rubber products made by Republic men.

CHALLENGER TRANSMISSION BELTING

Top Performance on Toughest Service

Challenger Belting is recommended for all around transmission of power. It has maximum strength for severe stresses and shocks. Hard duck impregnated with live rubber friction gives minimum stretch and freedom from fastener troubles. Challenger has maximum flexing life for drives operating at high speeds over small diameter pulleys.

BUYMANSHIP and SALESMANSHIP

Let's look at your purchasing this way

Though you want the right price, isn't it product performance, availability, and delivery service that are of primary importance? It is good "buymanship" to consider all these factors when you are purchasing transmission belting, conveyor belting, and hose.

Republic Rubber Distributors, located throughout the nation are competitive in price on transmission belting, conveyor belting, and hose of all kinds. They are prepared to offer recommendations on product applications, they carry large inventories which are available at your beck and call . . . and personal attention to your purchasing requirements is their stock-in-trade. This is good "salesmanship." Only distributors give so much service.

Let's combine your good "buymanship" with Republic "salesmanship" for better product selection. Mail the coupon or write and we will give you the Republic distributor's name in your vicinity.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION · YOUNGSTOWN, OHIO

Lee Deluxe Tires & Tubes · Conshohocken, Pa.

MECHANICAL RUBBER GOODS BY
REPUBLIC RUBBER DIVISION

WHO REPRESENTS REPUBLIC IN MY AREA?

REPUBLIC RUBBER DIVISION · LEE RUBBER & TIRE CORP.
YOUNGSTOWN, OHIO

Name, title_____
Firm_____
Address_____
City_____ State_____

The New DODGE "ROUTE-VANS"

17½" Floor to ground

72" Inside width

76" Inside height

but only

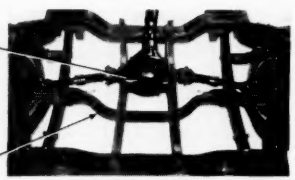
97" Over-all height

32" Side doors

All these advantages are made possible by this revolutionary new chassis

Full-floating *driving* axle. Differential solidly mounted in frame, and rubber-insulated. Drive to wheels is through slip-spline shafts and universal joints. Here is an outstanding engineering achievement.

Note *separate* I-beam load-*supporting* rear axle of special design.



This large-diameter propeller shaft; the rugged clutch and transmission; and the specially designed double-drop frame with husky side rails and rugged cross-bracing, insure long life and economical operation.

Extra rugged front-end construction . . . a "must" in frequent-stop service. Unusually heavy front axle. Large, flexible, rear-shackled front springs. Big brakes.

This 13½-inch "kick-up" contributes to the Route-Van's extremely low floor height.

Extra-rugged steering mechanism of double drag-link design minimizes road shocks at the steering wheel. Extra-wide 67-68-inch treads provide short turning diameters. Ease of handling in city traffic is outstanding.

FLUID DRIVE . . . Available, For The First Time, On Commercial Vehicles!

DODGE
"Job-Rated"
TRUCKS
FIT THE JOB . . . LAST LONGER

. . . maybe I should have used Stainless Steel, too!

FATHER TIME certainly took a beating from Stainless Steel equipment in 1948. And his prospects look even dimmer for the future. For, with more and more long-lasting Stainless Steel being used every day, corrosion, wear, thermal stresses and hard service are meeting their match—and Time's grim harvest of prematurely worn-out equipment is getting more meager yearly.

If your equipment must handle corrosive products, has to withstand excessive wear, is exposed to extremes of temperature and pressure, Stainless Steel —and especially U·S·S Stainless—will help you resist Time's relentless challenge.

So, start 1949 *right*. Plan to extend the life of your equipment by a more extensive use of Stainless. And to take full advantage of the many benefits this versatile steel has to offer, plan to use time-tested, *perfected* U·S·S Stainless Steel. Our engineers are specialists in its application. They will gladly show you how and where to use it to give you optimum results at minimum cost.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-192

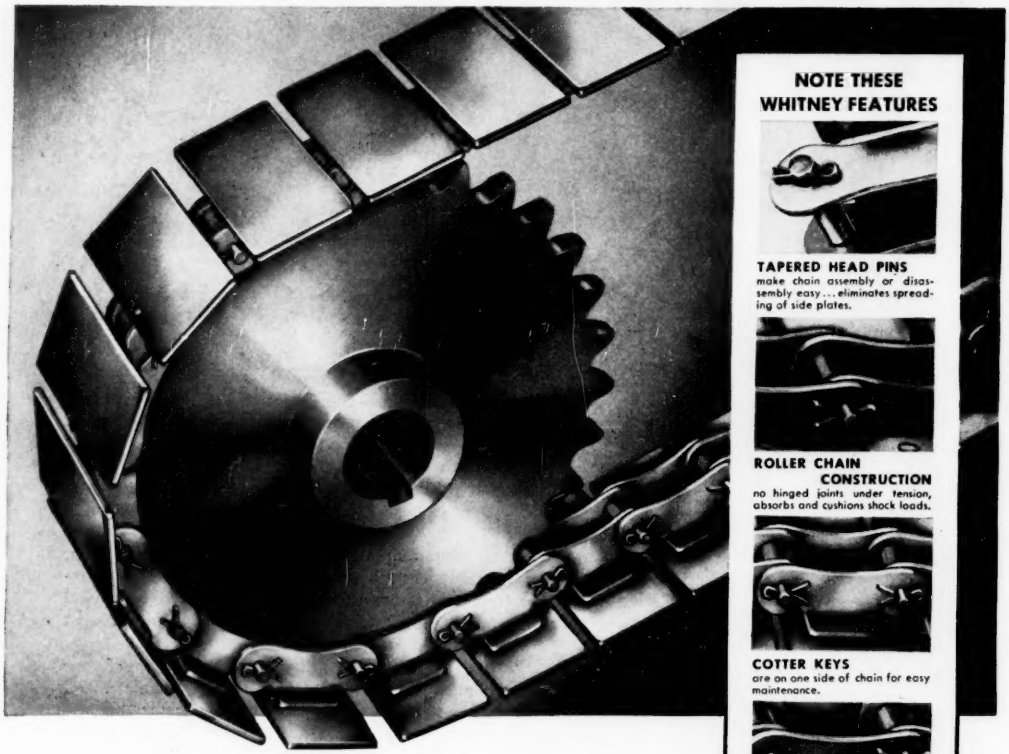
UNITED STATES STEEL

Announcing

THE NEW WHITNEY

Platform Conveyor Chain

For Unit Conveying of Bottles, Cans, Small Package Goods



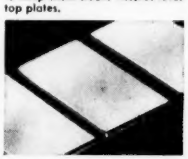
NOTE THESE WHITNEY FEATURES

TAPERED HEAD PINS
make chain assembly or disassembly easy . . . eliminates spreading of side plates.

ROLLER CHAIN CONSTRUCTION
no hinged joints under tension, absorbs and cushions shock loads.

COTTER KEYS
are on one side of chain for easy maintenance.

ALL WELDED CONSTRUCTION
elimination of rivets makes it easy to keep chain clean. Assures level top plates.



NEW BEVELED EDGE
top plates have new edges for smooth, sure transfer from one conveyor to another.

Again Whitney leads in chain design with the new Platform Conveyor Chain! This new construction assures smooth, steady travel for all types of bottle and package materials, regardless of length or speed of conveyor line. It will help you to maintain production by reducing traffic jams, spillage and breakage.

Whitney Platform Conveyor Chain is manufactured in various widths and materials of platform plates, covering all requirements of conveying.

Whitney Silent and Roller Chains, plus Cut Tooth Sprockets . . . the all steel drives . . . simplify your power transmission designs. Specify Whitney for dependable, smooth operation and long life. Write for information.

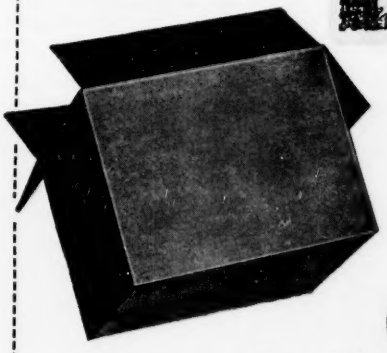
WHITNEY CHAIN & MFG. CO.

Division of Whitney-Hanson Industries, Inc.

226 HAMILTON STREET, HARTFORD 2, CONN.

A Pedigree is a Promise of Quality . . .

IN BOXES TOO!



PROMISE OF *Quality*
PROMISE OF *Service*
PROMISE OF *Fair Price*

THE PEMBROKE WELSH CORGI, as we know it today, traces its history back to 1107 when Flemish weavers brought it over to Wales as a cattle dog. Hardy, alert and intelligent, members of this little breed make very rewarding household pets.

THE Union shield trade mark identifies boxes with a pedigree that goes back to the timber in Union's own forests.

Only fibre from fresh cut trees goes into Union boxes and completely integrated production, under one management in the world's largest Kraft pulp-to-container plant, is checked and rechecked every step of the way to maintain consistent high quality standards without variation.

Five of the nine largest paper machines in the world and four modern box plants are your assurance of getting Union boxes when and where you need them.

And 75 years of leadership in paper packaging stands ready to help you in any problem of package engineering or design.

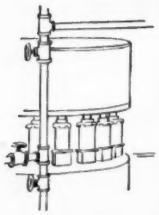
UNION *Corrugated Containers*

UNION BAG & *Paper Corporation*

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: **SAVANNAH, GA. • CHICAGO, ILL. • TRENTON, N. J.**

Prevent Contamination ..Use Globe Stainless Steel Tubes



If you have a contamination problem . . . if it involves tubing . . . consult Globe Steel Tubes Co.

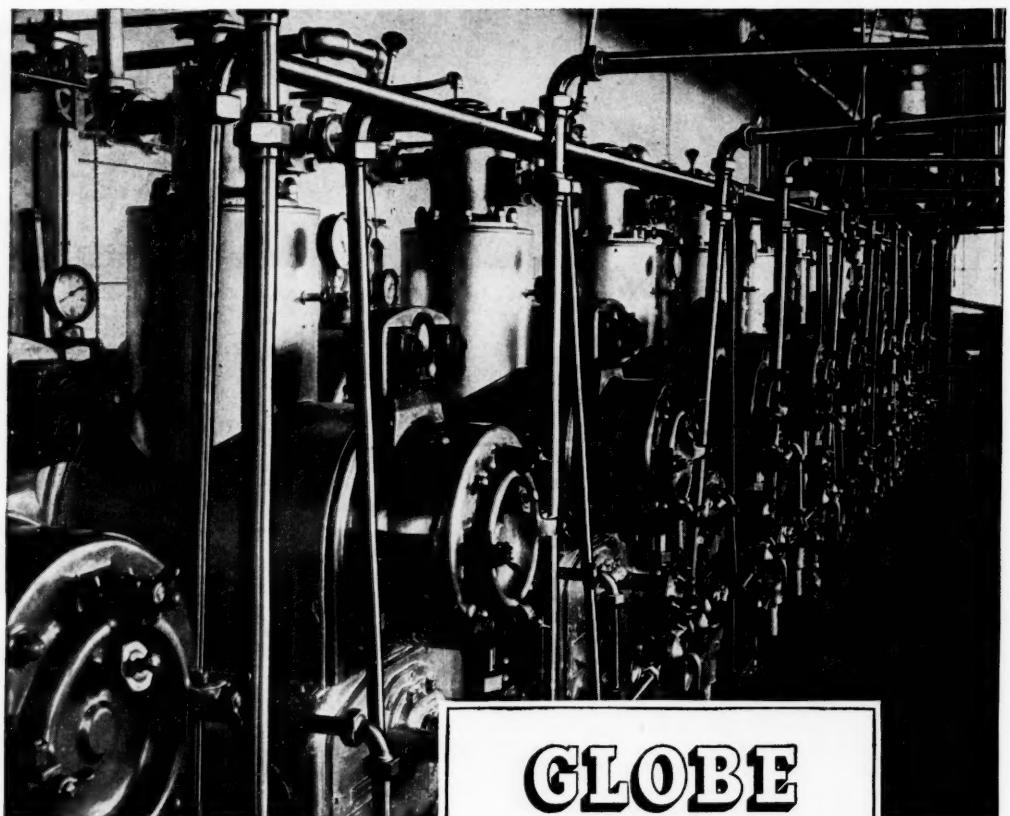
Why consult Globe? Because for 40 years they have been assisting processing industries to solve problems of contamination, sanitation, corrosion, scaling and other causes for tube failure.

Today's wide variety of stainless steels pose problems in selection . . . Globe Steel Tubes Co. has the experience and "know how" to help you in selecting seamless stainless steel tubing or Gloweld (electric welded) stainless steel tubing in the exact analysis, size and finish you need. What's more, your requirements will be worked out in your plant and in cooperation with your engineers . . . tested and approved in the Globe Steel Tubes Co.'s fully equipped metallurgical, physical and chemical laboratories . . . to assure you most satisfactory results with a maximum of economy.

Let Globe Steel Tubes Co. assist you in surveying your tubing needs and you are assured of an outstandingly dependable source for steel tubing of all kinds: Stainless, Mechanical, Alloy Steel and Pressure . . . a wide range of sizes and types to meet your requirements . . . plus the engineering and research facilities to solve your tubing problems.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin.

Photo Courtesy Creamery Package Mfg. Co.



GLOBE
Stainless
STEEL TUBES

Free valuable technical data in Globe's new Stainless Steel Analysis Chart, Bulletin No. 301.

1 **1760**—A strong back, sharp axe and plenty of time and patience were a *must* for the frontier homebuilder. He cleared the land, felled his trees, hewed logs to fit and hoped his house wouldn't leak when he finished.

2 **1875**—Lumber, the universal building material, was a budding industry. But woodworking machinery was hard pressed to keep pace with the tremendous demand. Urgently needed was low cost electrical power to boost output.

3 **1915**—Howell "Red Band" Electric Motors appeared. Applied to machines in woodworking and other important industries, these rugged, industrial type motors soon won wide recognition for making good on tough jobs.

WORKING WONDERS WITH WOOD

(Up to 225 Feet Per Minute)

4 **Today**—Electrically powered machines work wonders with wood. This modern moulder, for example, using 5 Howell Industrial Type Motors, can shave, trim and form four sides of a wood strip at the rate of 225 feet every minute . . . job costs are cut . . . *more* people enjoy *more* goods at less cost.

Here's another example of a tough industrial job solved by Howell Motors—the accepted industrial type motor.

Whether it's on planers, moulders, saws, lathes, pumps, fans, conveyors or dairy equipment, dependable, precision-built Howell Motors are an important source of power.

Are you using Howell Motors?

Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.

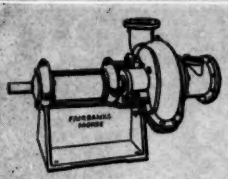
Here's another precision-built Howell Motor . . . industrial type with copper or bronze bar rotors . . . specially insulated . . . statically and dynamically balanced.

Howell Protected Type Motor

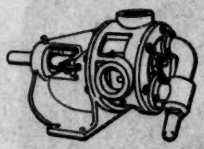
HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

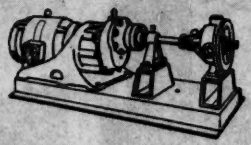
Manufacturers of Quality Industrial Type Motors Since 1915



Paper Stock Pumps



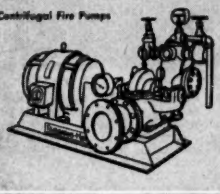
Frame Constructed Rotary Pumps



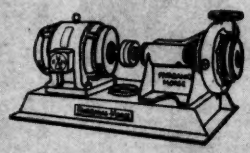
Rotary Pumps with Geared Head Motor Drive

Vertical Propeller Pumps

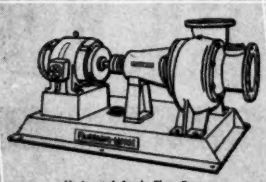
Centrifugal Fire Pumps



Two-Stage Builtogether Pumps



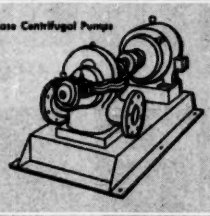
Horizontal Sewage and Trash Pumps

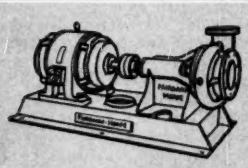


Horizontal Angle Flow Pumps

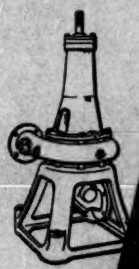
Vertical Close-Coupled Sewage and Trash Pumps

Split-Case Centrifugal Pumps



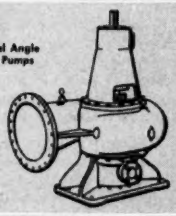


Base-Mounted Centrifugal Pumps

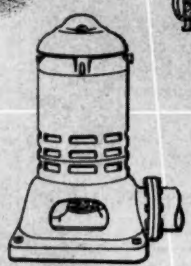


Vertical Sewage and Trash Pumps

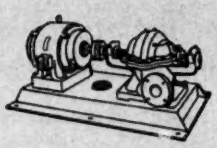
Vertical Angle Flow Pumps



Builtogether Centrifugal Pumps



Deep Well Turbine Pumps



Two-Stage Centrifugal Pumps

Duplex Steam Pumps

8 Cover Side-Pot Duplex Power Pumps

for Pumps...

THAT DELIVER

plus performance
lasting dependability
unsurpassed economy

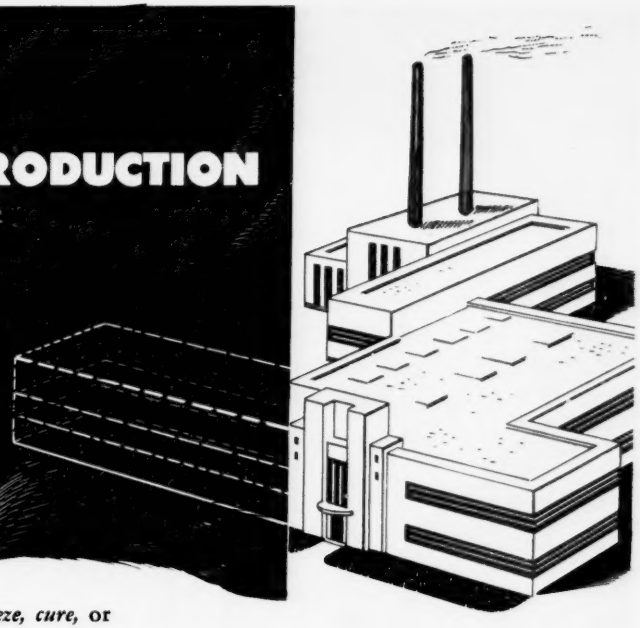
The Fairbanks-Morse Pump Dealer is your best bet for assistance in pump selection...for reliable service. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES
MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS
and STANDPIPES • FARM EQUIPMENT • MAGNETOS

How to INCREASE PRODUCTION *without* PLANT EXPANSION



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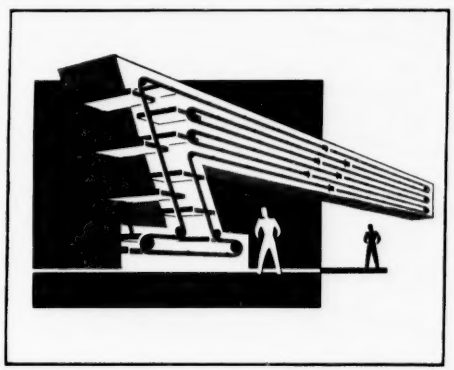

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McGraw-Hill Surveys BUSINESS NEEDS

If it can get the money American industry in 1949 will go full steam ahead with a vitally-needed program of improving its facilities. This program since V-J Day has kept business expanding and has made belated headway in modernizing industry.

Furthermore, if it can get the money American industry will carry on for the next five years with its unprecedented program of expenditure for new plant and equipment. Plans already made call for spending about $55 billion.

These are findings of the McGraw-Hill national survey of "Business' Needs for New Plants and Equipment." Major results of the survey, which have been rechecked since election day, are summarized on the following page. They report what American industry is now planning to spend for new plant and equipment. *They do not and cannot show what will be done if the plans are hamstrung by political action.*

In 1949, the survey shows, American industry plans to spend $14.1 billion for new plants and equipment. That is only about 5% less than was actually spent in 1948.

If these plans are carried out, actual capital expenditures this year may be somewhat larger than they were in 1948. That is because expenditures usually prove to be larger than planned.

Fulfillment of American industry's plans for investment in new plant and equipment this year would no doubt mean a continuation of general prosperity. The record shows that when capital expenditures are high general business thrives.

Even more remarkable than the 1949 prospect is the fact that:

Industry already plans to spend $41 billion in the years 1950-53 to improve its plants and equipment.

Plans tend to taper off, of course, as they are pushed further into the uncertain future, five years from now. But the striking fact is that plans for expenditures so far ahead are as great as they are. They show American industry's need for tremendous improvements in its plants and equipment.

Again, let there be no mistake. These survey findings are not a five-year forecast. They report what leading corporations now are planning to do — *if they can get the money.*

But — won't industry be top-heavy with plants and equipment if it carries through any such program?

The answer is clearly — "No".

Here are some of the reasons why not that were disclosed by the McGraw-Hill survey:

First, manufacturing industries are shifting emphasis from expansion to improving efficiency.

They have increased their total capacity 56% since 1939. Their expenditures in 1948 went almost 50-50 for expansion and improvement. But in the next five years they plan to spend three-quarters of their funds to replace and modernize facilities, only one-quarter for expansion.

Second, the prospective rate of expenditure for new plant and equipment is relatively low.

Planned expenditures for new plant and equipment in 1949 represent about 7.5% of the present value of all plant and equipment. That rate of capital expenditure is no higher than the rate during previous periods of prosperity. And industry must overcome years of starvation for new equipment, caused first by the depression of the 30's, then by diversion to war production.

Third, industry is following an extremely cautious policy in buying new equipment.

Three out of four companies report that they will not buy equipment unless it will pay for itself within five years. And a third of the companies report that they expect new equipment to pay for itself within three years. The reason most frequently given for such expectations was that all the money available can be spent on equipment which does pay for itself quickly.

The program of capital expenditure planned by American industry is one of the greatest bargains ever offered to the American people.

To pay for itself in a few years, as equipment must if most companies are to consider buying it, that equipment

continued on next page

WHAT THE SURVEY SHOWS

● HERE ARE THE MAJOR FINDINGS of McGraw-Hill's survey of "Business' Needs for New Plants and Equipment". Rechecked since Election Day, results show what industry is now *planning* to spend for new plants and equipment. They do not forecast what will actually be spent. The survey shows:

1. Industry now plans to spend $14.1 billion in 1949 – and almost $41 billion in the four years beyond, 1950-53.
2. Manufacturing industries alone plan to spend $7.2 billion in 1949. This is 7.5% of the estimated value – $96 billion – of all manufacturing facilities.
3. Manufacturers estimate conservatively that it would cost $136 billion to completely replace their facilities with the most modern plants and equipment available.
4. Postwar expansion is virtually complete in most manufacturing lines. Major exceptions: steel and petroleum refining.
5. Expansion programs of railroads, utilities, and oil companies still have two to five years to run.
6. Manufacturing industries have increased their capacity 56% since 1939. But expansion is slowing down. Increase planned in the next five years is only 13%.
7. Efficiency is emphasized more and more in planning new facilities. Manufacturers plan to devote almost three-quarters of their funds to replace and modernize. In 1948, 58% went to increase efficiency this way.
8. Equipment should pay for itself in five years or less, say three out of four manufacturing companies. New buildings, say 77% of them, should pay out in 15 years or less.
9. Profits and reserves are counted on to pay for new buildings and equipment by three out of four manufacturing companies. Some 15% expect to borrow, only 9% plan to sell stock. However, 20% would like to sell stock, only 4% want to borrow.
10. More liberal depreciation allowances for income tax purposes would prompt almost two-thirds of the companies to speed their purchase of new plants and equipment.

● A copy of a complete report on "Business' Needs for New Plants and Equipment" may be obtained by writing me at McGraw-Hill Publishing Co., 330 West 42nd St., New York 18, N. Y.

must promise to produce much better products or make great savings in labor and material. The savings go first to the companies buying the equipment but, as they always have, they soon spread to everyone in the form of better products at lower costs.

Where does industry expect to get the money to buy this bargain for the American people?

Most of the companies covered by the McGraw-Hill survey (76% of the total) count on their own resources – largely profits – to pay for new plant and equipment. About 15% of them expect to borrow money, although only 4% like the idea of getting saddled with fixed debt. Only 9% of the companies expect to sell stock to investors, although twice that many report they wish they could.

What are the chances that business can get the money?

The survey provides no answer to that question. No survey can.

The answer will come from Washington – in what Congress does about taxes on profits and taxes on the millions of Americans who might invest a part of their income in industry's new plants and equipment.

The answer will be found also in the energy and skill shown by investment bankers, particularly in mobilizing the resources of the millions of Americans whose incomes have increased enough since 1940 to make them potential direct investors in industry.

Still another important part of the answer will be given by labor leaders. About half the companies surveyed by McGraw-Hill are holding back on new construction – primarily because of high costs. What organized labor does about wages and productivity can swell or shrink that percentage.

The McGraw-Hill survey leaves no doubt that American industry is fulfilling its responsibility. It is planning the capital improvements needed to make the nation secure, prosperous, and progressive.

But business today lacks confidence and badly needs added incentives. Proper taxation and increased depreciation allowances are vital if we are to open the capital markets to finance industry.

What will happen now depends in large part on what is done in Washington. In his State of the Union message, the President said that "business should plan for steady, vigorous expansion." But in his budget message he proposed new taxes which would divert a substantial share of the money industry is using for expansion and improvement. Moreover, he said nothing about the vital issues now freezing the capital markets.

It is not possible to have it both ways. Fulfillment of the President's tax program means cutting industry's program for new and better equipment. It means slowing down industrial progress. It means delaying the advance toward much higher standards of living tomorrow in order to have a little more government spending today.

I urge you to see that your Representative and your Senator have all the facts on industry's needs for new plant and equipment. What they do to this program will have a decisive bearing on the nation's security and welfare.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This is the fourth editorial of a special series on industry's needs for new plants and equipment – and what these needs mean to all Americans.

FEBRUARY, 1949

Food Industries

Business Must Sell Itself — Get Into the Act

Businessmen are paying today for the mistakes made by their predecessors two generations ago. That is an apt observation made recently by one of the food industries' outstanding executives. The sad part of it is that businessmen have long since corrected most of those mistakes. But they have made another slip-up.

They have failed to tell the public—even their own employees for the most part—of their commendable practices, policies and achievements. Most serious of all, they have failed to tell people how little profit they make.

About the only nice thing that the public understands about industry in this country is that it did a terrific production job when the chips were down in World War II.

As a matter of fact, business still is the principal force in the "battle" to preserve the American way of life. It is the hub about which the entire American system revolves.

And something ought to be done by businessmen to get recognition of this fact. Business leaders realize this, and many progressive companies are conducting their own enlightenment programs. But the number is too small. Every company, large and small, ought to get into this act. With each doing the job in its own community, the entire country would become informed of the facts about business. And since the people still run this country—and usually make intelligent mass decisions *when they have all the facts*—the interests of business would be fairly guarded.

That people don't have the facts has been demonstrated by opinion surveys. No less than 24 percent lean toward some drastic change in our social, political, and economic system. Two-thirds believe that industrial profits average about 20 percent of sales, and some guesses run as high as 60 percent. Obviously people are misinformed.

How can you do your part in this much-needed educational job? Well, start with your own workers. Use your house organ, letters mailed to employees at their homes, talks by top executives to employee groups, motion pictures, local advertising, bulletin boards, or any other media through which you can contact workers and their families. It is particularly important to reach families, as well as thought-leaders in the community. By the latter we mean the influential men and women in community life, such as teachers, clergymen, club leaders, newspaper editors, and bankers.

We know of one company which last year hired the largest hall available in each town where it has a plant. As many employees and their families as could be crowded in were invited to the meeting place. Then the president personally told them facts about the company. He explained products, policies, pay, projects, profits, and the place of the business in the local and national scheme of things. In so doing he not only filled mental vacuums with facts, or displaced wrong information with right, but he gave the business a personality—his own. Since anyone who hears this executive speak is impressed with his right thinking and fair mindedness—and further, takes him for a "regular guy"—the business becomes associated with someone and something to admire and respect.

If you run a relatively small food processing business, perhaps you cannot afford to make public-relations movies, and possibly you don't even have a house organ. But you have one advantage.

You can easily make personal appearances before your employees and their families. You can get them to think of you as "Bill" and like you and the way you run your business.

If you do that, you will have done the job which each business man should do to get free enterprise appreciated by the people who run the country. When that is done there will be little to fear from government, and the communizers and socializers will be stopped in their tracks.

—F. K. LAWLER, *Editor*

The Talk of the Industry

A Highly Significant Address

Research folks at headquarters of H. J. Heinz Co. are happy, and a bit amused. The new building program of that company—on which $15,000,000 will be spent—includes a large sum to build a new research and quality-control center.

The prospect of this fine new building, especially designed for local needs, is full justification for their delight. It would be nice if many other companies could give such generous and deserved recognition to their research-housing needs.

The amusement of the Heinz group comes from the street address of the new building: "Progress at Heinz." The building will front on Progress St. at the corner of Heinz St. What could be more appropriate?

Deaf Mutes Solve Labor Problems

By a single stroke of genius, a small pretzel manufacturer recently solved two troublesome problems. Annoyed by the low productivity of the talkative workers on the pretzel-twisting line, this processor thought of a cure. He would hire twisters who couldn't talk. That he did—deaf mutes. And production jumped, not merely because of no talking, but also because these people were extremely handy with their fingers." So he solved a second problem of how to effectively utilize a particular type of handicapped person. He has no patent on the idea.

Practical Pointers on Bugology

DDT has been found the most satisfactory insecticide by Sealtest—and all the newer ones have been considered carefully. A residual spray of 5 percent DDT in odorless kerosene is repeated every three months. To check the thoroughness and regularity of application, the sprayed surface is examined with a magnifying glass. When present in proper amounts, the insecticide crystals reflect light. You, too, may find this bit of bugology useful.

Colossal California

In the habit of doing things on collossal scale, California has greatly increased its population since 1940, the increase amounting to 45.2 percent to put the state in the ten-million population class along with New York and Pennsylvania. Aside from California, the biggest population gainers are Michigan, up 939,000 since 1940; New York, up 907,000; Ohio, 891,000; and Texas, 815,000.

The big boom in the number of customers for food processors on the West Coast will help to offset the bad effects of the higher freight rates to points East.

Touchy Competition

Rapid growth of the prepared baking mix business has posed a ticklish situation with respect to intra-industry competition. Flour millers have built up a nice volume in add-liquid-and-bake products for the homemaker. At the same time they are doing nicely in the sale of prepared mixes to commercial bakers and institutions, as well as in the sale of flour to these users. So when the advertising of the flour miller entices the homemaker to purchase prepared mixes and do her own baking, the miller runs the risk of offending some of his very good customers in the baking industry.

Some argue that the advertising of prepared mixes so whets the appetite for baked products that the commercial bakery does more business regardless of the sale of prepared mixes. Others don't feel so broadminded about it.

In the long-run there is only one sure way to meet competition for the homemaker's dollar. That is to give the homemaker more for less. In foods this involves not merely quantity and price, but quality and convenience.

In the miller-baker situation, however, neither side has to worry very much. There is plenty of business to keep both reasonably happy. After all, the number of food consumers is increasing every day.

You Read It Right, Sir

We could hardly believe our eyes when we saw 32.95 above a 2-lb. jar of Foie Gras Aux Truffles. A salesman assured us that the figure 3 was not supposed to be a dollar sign. Yes, the price was $32.95 a jar. No, that was not the most expensive food he knew. Caviar, the gen-u-wine imported Russian kind, sells for $33 a pound. No wonder there is talk of a fourth-round of wage increases.

Hors d'Oeuvres

■ Did you remember to observe National Kraut & Frankfurter "Week," February 3 to 12? Even if you didn't, you can skip right into National Hot Tea Week, from the 11th to the 18th. But the cherry folks aren't worried. They know they can let George do it through the final week.

■ Will hogs gain faster if you give them night lights so they can eat a midnight snack? *Farm Journal* is asking and reports three midwestern hog raisers who say yes. If it helps any, we can report that the system works with most humans.

■ Labor Relations Institute, reporting a study, says: "The salient discovery . . . is that the Russians have not discovered that there is a direct positive correlation between human relations . . . and high production." Bet if you kept looking you'd discover that they hadn't discovered human relations, either.

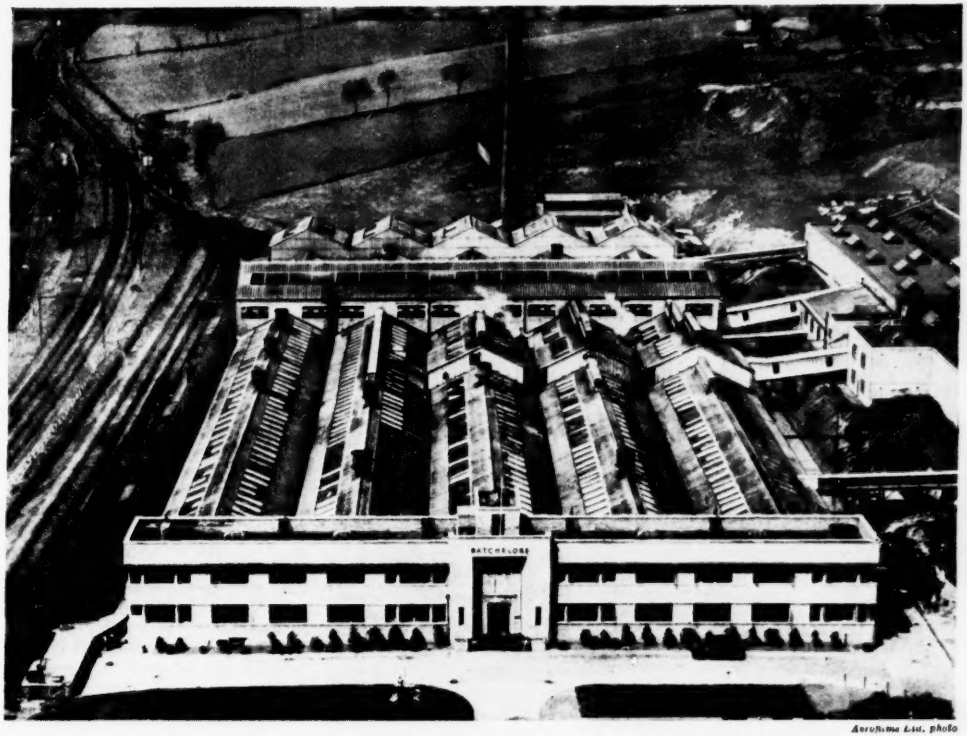
■ The American Bottlers Assn. computes 1947 consumption of soft drinks at 19,400,151,928 bottles. Figure in 2c. deposited, then rebated on the return of each empty bottle, and you've got one deuce of a lot of business going on here.

■ A U. of Arkansas chemist is reported to have developed a new food product made from milk. Looks like meat, has the nutritive value of meat. Nothing said about taste, but it looks from here like a challenge to that artificial yeast-steak concocted by the beer boys.

■ Candy sold in movie houses added up to $500,000,000 in 1947. Almost justifies the existence of a lot of the pictures.

■ Be very careful when traveling in Canada. A service club in Trenton, Ont., has invented "eggburgers," which are just what you'd expect them to be.

■ Borden's supplied a glass-lined milk truck to haul water when wells went dry at a Sinclairville, N. Y., school. Bet Borden's is glad Elsie can't read this. **J.A.J.J.**



Aerofilms Ltd. photo

MODERN, one-story Batchelors pea cannery at Sheffield. Raw materials come in one side, finished products go out other. Plant is of advanced design, and it is arranged for straight-line flow like modern American ones.

British Food Processors Make Best of Bad Situation

They display ingenuity to overcome handicaps. Operations vary from antiquated to modern. Achievements are inspiring and ideas useful—Part I

JOHN H. NAIR
Assistant Director of Research,
Continental Foods, Inc., Hoboken, N. J.

Note: The author reports conditions in the British food industry from first-hand observations. He recently returned from a six weeks' visit among leading English food manufacturers. —The Editors.

The American food technologist who visits English food plants today is impressed with the amazingly good job being done, despite the restrictions and difficulties under which the industry operates.

In the face of shortages in equipment, raw materials, packaging supplies, modern processing equipment, and even of replacement parts, a great deal of ingenuity is required. Every effort is being made to increase exports, but production falls so short of meeting the requirements of the national economy that exportable food items are limited.

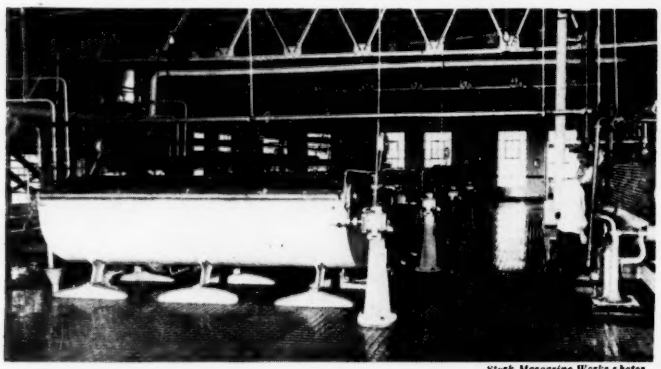
Governmental controls strictly limit operations of the manufacturer in the interests of maintaining a managed economy. Processing of certain products in fixed volume by particular plants is controlled through a system of licenses and allocations. The food processor receives an allocation of raw materials through the Ministry of Food. Allocations are in proportion to his prewar volume of product.

The processor then converts these materials into processed items, using such equipment and facilities that are available in his plant and employing labor at a fixed, area rate. The finished goods are packaged in many instances without individual identifying wrappers. They are then packed into fiber cartons. About 50 percent of these containers have been salvaged through a government-sponsored agency, and returned to the original factory for re-use. The selling prices for the final products are established by regulations which are uniformly applicable throughout each branch of the industry.

Prior to Nov. 1, 1948, limitation on monies that could be expended for plant repair and upkeep in any one factory unit, without special licenses, was fixed at $400 a year. This amount has now been raised to $4,000 a year.

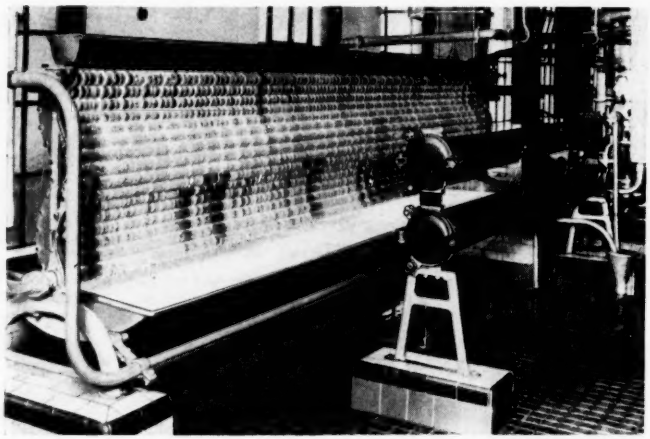
One particularly notices how salvaged materials and rebuilt equipment have been effectively used to streamline operations and to improve working conditions. Despite the limitations

Milk Processing Methods Compare Favorably



Stork Margarine Works photos

PASTEURIZING of milk takes place in these large tanks, located in the milk room at Stork Margarine Works. Cleanliness is accented.



COOLING pasteurized milk. Enclosed coolers sometimes are used. Note sanitary tile floors which feature this plant, also special equipment footings.

imposed by shortages of building materials and equipment, the engineer and the food technologist have used great ingenuity in devising methods of getting a new or better processing job done.

In a few instances, special licenses have been obtained to construct new buildings and to import special equipment not manufactured in England. If the machines ordered are made by English concerns, import licenses are not issued, and it is therefore necessary to wait until orders can be filled at home. Most deliveries at this time take 18 to 24 months.

Liquid Milk Production Up

To get a better conception of what the different branches of the British food industry are doing, let us review some of their present operations:

Production of milk for market sale has increased about 11 percent in England during the past eight years. This increase has resulted from better channeling of milk to plants rather than its use on the farm, better management of herds, and improved feeding methods. Total cow population in England, Scotland and Wales is just over 4,250,000 head. The average production per milk cow in 1947 was 550 gal., about 90 percent of which was distributed in the form of fluid milk products.

A country-wide program for building up herds through artificial insemination is under way. This program is expected to lead to a marked increase in the annual production of milk.

The adoption of pasteurization for market milk has been far behind the progress made in this direction in the U. S. While not yet universal, pasteurization has been widely adopted during the past ten years. In the larger city plants, the methods of processing compare favorably with those in the U. S. High-temperature, short-time pasteurization is common practice. Plate-type pasteurizers are widely used for heating milk to 162.5 deg. F., holding it at this temperature for 20 sec., and rapidly cooling it to 35 deg. F.

Allot Milk According to Need

The distribution of bottled milk is based on need rather than on purchasing power. Each nursing mother is allowed 1 pint (20 fl. oz.) per day and each child under five is permitted 7 pints per week. Considerable supplementary milk feeding takes place through the schools. The remainder of the available milk is distributed equably to the rest of the population. Allocations vary according to the season of the year, but average about 2 pints per week.

Milk for nursing mothers and young children is sold at 1½ pence ($0.025) per pint. But it can be obtained free if the family lacks money. The ordinary price is 4½ pence (about $0.075) per pint. Sale of fluid cream is prohibited.

Today, manufactured dairy products are not of great importance in England, since only about 10 percent of the total production is available for such use. The government subsidizes National Dried Milk—a roller-dried whole milk product—to the extent of 2 shillings ($0.40) per pound. This product is sold as an infant food at 8½ pence ($0.14) per pound. Proprietary brands of dried milk baby foods are also on the market, where they compete under the same rationing system with the subsidized National milk.

Ice cream, as manufactured in England today, is a misnomer, since it contains no butterfat and not more than 1 percent milk solids-not-fat. Yet, the demand for the frozen product sold as "ice cream" is so far in excess of the supply that one has difficulty in purchasing it outside of hotels and restaurants.

"Ersatz" Is the Word for It

Ingredients are hydrogenated vegetable oil, wheat flour, barley flour, cane sugar, various stabilizers, emulsifiers, and flavoring materials. The resulting mixture, when frozen, falls far short of what Americans would consider a satisfactory ice cream. However, in the absence of such a yardstick as American ice cream, the Englishman finds the local product very acceptable.

In the large ice cream plants, methods of mixing, pasteurizing, homogenization, also storage and freezing

parallel closely the best American practice. Batteries of continuous freezers were observed, and some installations of continuous quick-hardening units were seen for small briquettes about the size of an Eskimo Pie. These briquettes and individual cups constitute the bulk of the ice cream produced. Bulk packages appear to be confined to 1- and 2-gal. containers that go to catering establishments, hotels, and restaurants. (See FI's cover photo of British ice cream plant.)

The soda fountain, as it is known in the U. S., is nonexistent in England. For this reason, there is not the demand for the bulk packaged ice cream, which is universal in the U. S. Prior to the war, one or two companies employed thousands of tricycles for consumer-distribution of individual portions of ice cream refrigerated with dry ice. These tricycles have entirely disappeared, and lightweight motor vehicles are now widely used.

Margarine Taking Place of Butter

Margarine, rather than butter, is usually used as a spread for bread in England today. In prewar days, however, the quantity of butter used was more than twice that of margarine. For example, for 1938 the figures were 519,000 tons of butter and 217,000 tons of margarine.

Table margarine contains hydrogenated vegetable fats and oils, but a fair proportion of animal stearin is used in pastry margarine. Manufacture is mainly concentrated in a few large plants, but there is also a number of small capacity units. One of Lever Brothers & Unilever Limited's plants located in Bromborough can produce 4,000 long tons per week. This is equal to one-half the entire consumption of margarine in the U. S.

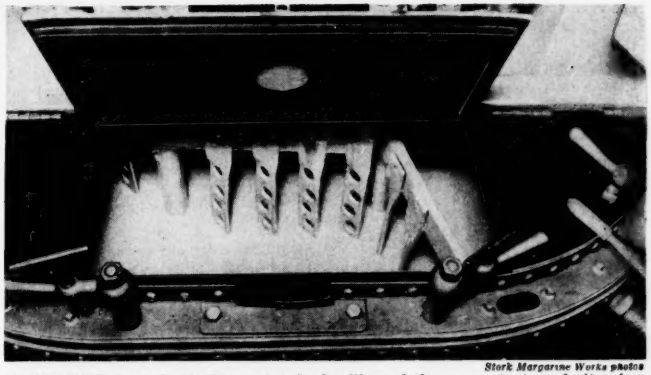
Vegetable oils are refined, hydrogenated, and deodorized before they are blended with cultured skim milk, salt, flavoring, color, vitamins, and emulsifying agents. The mixture is churned, drum-cooled, matured for a short time, kneaded by a multiplex system, balled up, and subsequently worked or plasticized to obtain the desired consistency.

Finally, the margarine is cut in ½-lb. blocks and machine-wrapped in parchment paper. Individual brand labeling is not used today since allocation of fats is controlled by the Ministry of Food. Therefore, manufacturers turn out a "National Margarine" in conformity with standards set up by the Ministry.

Livestock is Allocated

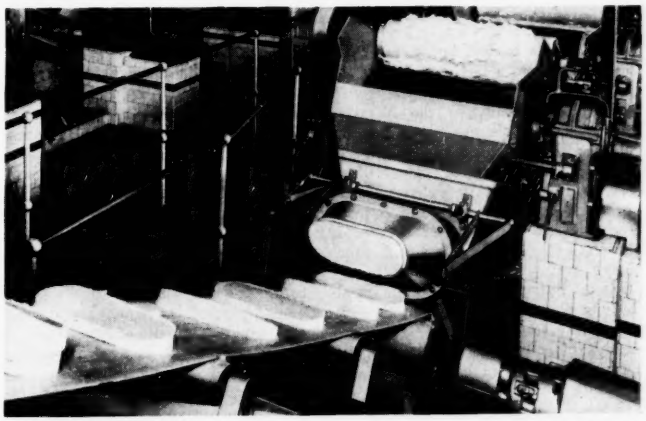
Handling livestock and converting it to meat products is one of the most rigidly controlled branches of the food industry. Consumer rations of meat

Margarine Operations Are Conducted Efficiently

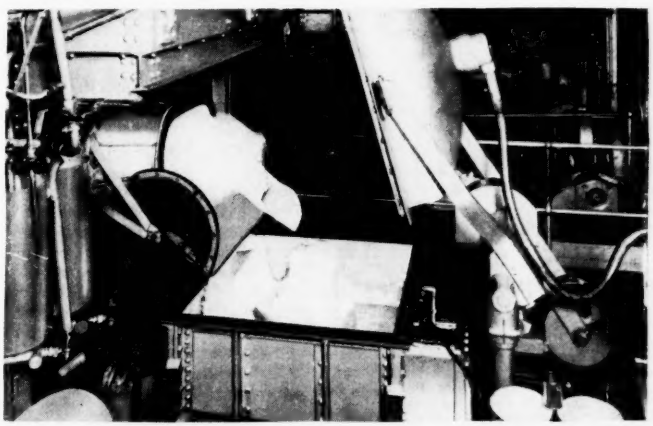


Stork Margarine Works photos

CHURNING the refined oils, pasteurized milk, and the concentrates of vitamins A and D. Note the rugged design of the twin-motor churning mechanism.



KNEADING margarine to right texture by multiplex process, which consists of rolling it between three sets of rollers and cutting it into slabs.



BLENDING margarine in heavy-duty mixer with easy-opening counterweighted lid. Product discharges into mixer. Note retractable slide at outlet.

in England are at a very low level—a condition that naturally exerts great pressure toward the diversion of animals from farms to the "black market." Receipt of infinitesimal quantities of livestock through such extra-legal outlets denotes good enforcement of the restrictions and a healthy respect by the public for governmental regulations. Violations are promptly prosecuted and very heavy fines and even jail sentences are imposed on dealers in "black market" meat.

A "Juggle" with Grain

The farmer who raises livestock receives an allocation of grain and concentrates through the Ministry of Food. This allocation is sufficient to supplement grazing and hay provided on his own pastures and fields. If he raises grain, provided he feeds it only to the livestock on his farm, he may retain all his oats and "dredge" corn and 20 percent of his wheat. In certain circumstances, he may keep some or all of his barley, but the balance must be sold to a buying agent of the Ministry of Food.

The farmer advises the Ministry when his animals are ready for the market. He is then directed to a collecting center or meat plant, where his livestock must be delivered at a price set by the government. A processing plant has no other sources of livestock than those allotted to it. Since every available effort is made to distribute livestock on a quota basis among all plants and companies—regardless of their efficiency—it is therefore difficult for better equipped, larger-volume slaughtering plants to operate either economically or efficiently.

Present production of pigs in Britain represents about 20 to 25 percent of the capacity of the meat plants. The average throughput of the plants now operating might be about 50 percent.

Some of the Headaches

The plant manager receives five or six days' notice of livestock that will be allocated to him for the following week. While deliveries are fairly level from week to week, they do vary considerably from day to day. Thus, he must maintain adequate staffs in all departments at all times because he may receive as much as 50 percent of the plant capacity on a given day and 10 or 15 percent on other days.

Labor cannot shift freely from one employer to another, and personnel cannot be laid off except on one week's notice. Wages must be paid for a minimum work week, regardless of the volume handled. These are some of the headaches that the meat plant manager has in England today.

It is impossible for a new manufacturer to start in the meat business because he has no prewar history of meat processing. In one rather modern plant in which pigs are slaughtered and converted into bacon, completion of the curing by smoking cannot be carried out despite adequate facilities available on the premises. Instead, the cured bacon must be shipped several miles down the road to another smoke plant.

Reason for this is that the first plant has no prewar history of smoking of bacon in any quantity. The second plant, on the other hand, specialized in smoking bacon—mainly of foreign origin. And it now operates at a fraction of its prewar output.

Today, 80 percent of the carcass weight—with few minor exceptions—must, by regulation, be converted into cured meat known as "Wilshire" style bacon. Thus, as compared with the position prewar, sausage plants are disadvantaged by the processing of bacon.

The curing of bacon is carried out by pumping carefully controlled nitrite-nitrate brine into the meat. Arterial pumping, although understood in England, cannot be applied to meat butchered for "Wilshire" style bacon.

Procedure With "Wilshire" Bacon

The sides of bacon are stacked in concrete tanks with some dry salting, battened down with wooden slats, and finally pickled in brine. The density and nitrite content of the brine is controlled, and it is used repeatedly for months—its pickling value apparently improving with time. Tanking takes four to six days, depending upon the size of the pig. After the sides are removed from the tanks, they are conveyed to a draining and maturing room. Here they are stacked flesh-side down for six days. During this time, a good deal of nitrite is formed.

Recovery of byproducts in slaughtering plants seems complete. Use is made of the blood, hair, bone meal, glands, gut, bone-jelly, and waste grease.

Lard rendering is carried out in a fashion similar to American practice. Pure lard is run into paper-lined cartons holding 28 lb. each. The lard is then turned over to the Ministry of Food at a controlled price (approximately $0.165 per lb.) which is established by regulations. In contrast, soap grease sells for practically the same price.

Sausages in Great Demand

The sausages manufactured in England are different from those made in America. Most of them are sold in the raw state, to be fried in fat or grilled. Before World War II, such sausages had 65 to 75 percent meat and fat, the balance being cereal, seasoning, and water. Pork is now so short in supply that most of the sausages on sale are made from beef; even then a maximum of 50 percent meat and fat is all that can be used.

Sausages are not rationed and are, therefore, in great demand. The casings used are either pig or imported sheep gut. No artificial casings have been seen in use anywhere in England.

The product is cooled and the surface is dried with a blast of air. The sausage is sold fresh. It is not refrigerated because many of retail shops lack refrigeration. There is some business in smoked sausage, but this is not of great importance in England.

Meat Pies Popular

Commercial meat pies are popular in England because they are not rationed. These pies consist of ground meat. They are made by the thousands in a straight-line operation.

Special doughs are rolled and stamped out to fit individual pie tins. A warm-water dough is used for the lower crust and conventional dough for the upper crust.

Considerable hand operation is involved in making meat pies. Baking is done in gas-fired, traveling ovens. Larger pies which will serve a number of people are prepared in round and rectangular shapes. Forms used for these pies are deeper than those for individual pies. Consequently, the crust is usually shaped in the tins and filled by hand.

It should be noted that these pies are sold in food shops without refrigeration and they are designed to be eaten cold. From an American point of view, the appetite appeal would not be high, inasmuch as these pies have a high percentage of trimmings. But in a country which is short of meat, these pies are sold promptly after delivery to the shops.

From Argentine and Australia

The meat used in pies and sausages consists largely of frozen Argentine beef and Australian mutton. These frozen meats are hung until soft, and they are then boned by skilled butchers. All bone and gristle is cut out, and the meat is used the same day that it is thawed.

Sausage mixing and casing-filling operations observed were of good design and high capacity, perhaps because they lend themselves to mechanization more readily than meat-pie manufacture. When available materials and machines permit, a considerable improvement in the latter will undoubtedly take place.

American Processed Foods Are Winning Cuba

With adequate prices for its large sugar crops, the little republic becomes an excellent market for imports from the United States

RAFAEL LAMARCHE VILLALON
Havana, Cuba

Consumption of American processed foods in Cuba has increased by leaps and bounds during the past two years. With meat prices reaching stratospheric heights, the Cuban housewife has been using ready-to-serve American foods in larger quantities from day to day. Incidentally, she is also learning how to save labor, time and money by serving canned soups, vegetables, meats, fish and sea foods, salads, preserves and desserts.

The Island Republic just off Florida (population 5,000,000) is enjoying extraordinarily prosperous times. With sugar crops of better than 6,000,000 tons, at a price of $0.04 per pound and over, the buying power of the Cuban population is about ten times higher than it was in 1938. Cuba has always been a good market for American tinned goods—mostly fruits, salmon and sardines—but the largest items of exports from the U. S. to this country were bulk goods, such as wheat flour, potatoes, red kidney and black beans, rice, etc.

Previous to World War II—and with the exception of the period comprising World War I, when sugar went up to $0.20 per pound—the money which the Cuban people could spend on American tinned foods was very limited. Consumption of American fruits and preserves was a luxury in which only the rich could indulge. The palate of the ordinary man did not have a chance to develop a taste for American delicacies.

Then, with the Second World War, the scarcity of food reached its climax when the United States—supplying fully 75 percent of the foods used in Cuba—joined the strife and faced the gigantic job of supplying her fighting forces and those of the European countries.

Wheat flour, pork, lard, rice, and other bulk goods imported from the U. S. became more and more scarce from day to day, while Cuban cattlemen found profit in shipping their choice meats to the U. S. by air. On the other hand, most Cuban farmers gave up their efforts to raise other crops and again concentrated on the production of sugar cane. Meantime, local manufacturers of preserves, canned meats, and sausages, who normally supplied a small percentage of the Cuban demand, were almost at a standstill from lack of tin, cartons, and other raw materials supplied by the United States.

Luckily, sugar went up during the war period to $0.05 per pound. And then scarcity of native products, plus a buying power increased tenfold, brought a rise in the consumption of American processed foods, first by the well-to-do people, and, gradually, by all of the Cubans. American canned goods—formerly pronounced overly "acid" for the Cuban palate in the case of fruit preserves, or "insipid" in the case of soups, meats, etc.—were now winning the Cubans' favor.

Cuban taste, as far as tinned goods were concerned, had been influenced by products put up in Europe—Spain, France, and Italy—where foods are highly seasoned. Very small quantities of American canned goods were imported into Cuba from the United States previous to the Spanish American War. But, even 25 years later, these imports of American tinned goods were limited to a few lines of preserved fruits, such as pears, peaches, apricots.

No Competition

When we stress the importance of the Cuban market for American processed foods, we are not forgetting domestic processing. An analysis soon clarifies this situation. Strange as it might seem to the average American, there is no organized production of quality vegetables in Cuba. Even tomatoes packed in the United States are preferred by users here. American vegetables and fruits are more solid, more concentrated than those grown

(Turn to page 208)

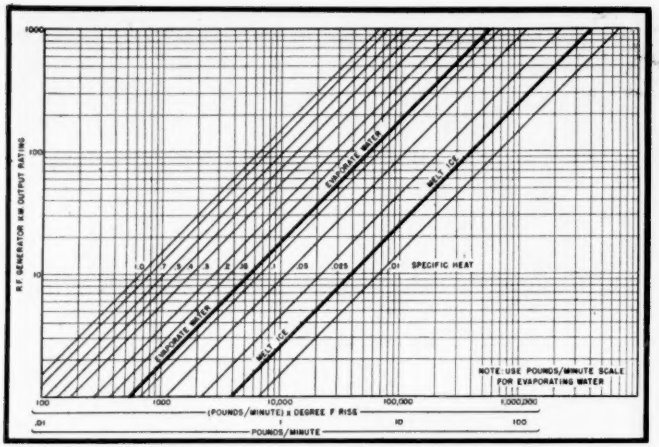


FIG. 1—**OUTPUT** of radio frequency generator for dielectric heating.

NEMA GENERATOR RATING KW	DUTY CYCLE IN PERCENT				
	100%	80%	60%	40%	20%
1	$ 0.20	$ 0.184	$ 0.168	$ 0.152	$ 0.135
2	0.24	0.22	0.20	0.18	0.16
5	0.44	0.40	0.37	0.33	0.30
10	0.70	0.65	0.59	0.53	0.47
20	1.25	1.15	1.05	0.95	0.85
50	2.90	2.67	2.44	2.20	1.96
100	5.15	4.75	4.33	3.90	3.50
200	7.90	7.30	6.65	6.00	5.35

NOTE: THESE FIGURES ARE BASED ON AVERAGE 1947 MARKET LEVELS

FIG. 2—**OPERATING COST** of radio frequency generator—dollars per hour.

TYPE OF WORK HANDLING EQUIPMENT	20 KW AND SMALLER	50 KW AND 100 KW
HAND LOADED HAND OPERATED CAGE WITH ELECTRODE	$ 250 – $ 1500	–
HAND LOADED ELECTRODES IN PRESS TRANSMISSION LINE MANUAL ADJUSTABLE NETWORK	$ 2500 – $ 4500	$ 5000 – $ 10,000
HAND LOADED MECHANIZED CONVEYOR TRANSMISSION LINE MANUAL ADJUSTABLE NETWORK AND OVEN TYPE ENCLOSURE	$ 7000 – $ 15,000	$ 10,000 – $ 25,000
HAND LOADED MECHANIZED CONVEYOR TRANSMISSION LINE MANUAL ADJUSTABLE NETWORK SUPPLEMENTARY BLOWERS EXHAUST FANS, STEAM COILS AND OVEN TYPE ENCLOSURES	$ 10,000 – $ 20,000	$25,000 – $ 60,000

NOTE: THESE FIGURES ARE BASED ON AVERAGE 1947 MARKET LEVELS

FIG. 3.—**COST OF ACCESSORY EQUIPMENT** for the R F heating operations.

These Charts Quickly Analyze Dielectric Heating

They give speedy cost evaluation of applications—such as defrosting, dehydration, deinfestation, and mold inhibition

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Industrial Electronics Div.,
Westinghouse Electric Corp.,
Baltimore, Md.

The technical knowledge necessary for a satisfactory economic study of dielectric heating has now been formulated into charts. These charts are so easy to use that there is no longer a need, in the large majority of cases, for an extensive study prior to an economic survey.

These charts make the survey a simple operation that can be performed in a few minutes time, even by one who has had no previous experience with dielectric heating. For they give a quick answer to the question, "Will dielectric heating pay?"

Results obtained from the application of dielectric heating to food products have been unique and frequently valuable. It has been used successfully to deinfestate grain and cereal products, melt chocolate, defrost frozen foods, and inhibit mold. Other applications include dehydrating, cooking, roasting and baking.

Because dielectric heating has been successful in the above uses, other food plant operators may be considering it for replacing an old method, or for an entirely new use. The short cuts detailed here are intended to eliminate the need for an extensive economic survey in such applications.

It has been demonstrated that a preliminary economic survey, to show reasonable justification before undertaking any extensive developments work, is sound business. The cost of such an investigation is eliminated by taking the following well-defined steps:

Step 1: Assume that the application under consideration is technically pos-

sible. Experience has shown that many applications are much more likely to be technically sound than financially sound. By taking this step, then, we get right down to the all important question of cost.

Step 2: Determine what size generator is needed to accomplish the desired result.

The need for technical knowledge in the execution of this step has been removed by summarizing such experience into an easily used chart. (see Fig. 1.) The curves on this chart are based on theoretical calculations which have been confirmed by data taken from typical applications, as well as by numerous laboratory tests. They cannot possibly take into account all the detailed requirements associated with a given job, and are therefore not intended for final, accurate engineering analysis.

Because of the wide variety of materials which may be heated dielectrically, the chart makes use of specific heat of materials as the determining factor. To use it for determining generator size, merely enter the chart with knowledge of pounds of material per minute to be processed for a given temperature rise. Use the curve labeled with the specific heat of the material being analyzed and read directly the generator size.

Evaporating Water

If your application is one that calls for evaporating water or melting ice, enter the chart with a knowledge of pounds of water to be evaporated per minute or of pounds of ice to be melted per minute and use the corresponding curve. The power so obtained is the amount necessary to supply the required heat of vaporization or fusion only. To it must be added the power necessary to raise the temperature of the water or ice, as the case may be. This power is determined from the chart in the normal manner—remembering, of course, that water has a specific heat of 1 and ice 0.5.

When the specific heat of a material includes the water contained within the material, no separate figure is necessary for raising the water to temperature. But in all cases where water is evaporated, power for vaporization must be obtained separately and included in the final power figure.

This chart, since it is based upon thermal factor only, gives the minimum possible size of RF generator required. Because of electrical factors present, the actual capacity required may be greater.

Step 3: Having determined generator size, ascertain its cost of operation. All the factors which affect the cost of operation of an RF generator—such as power cost, amortization, tube cost and maintenance—have been incorporated in a second chart (Fig. 2) for all NEMA standard size generators.

For most applications, continuous operation at full output from the generator is never realized. For this reason, Fig. 2 gives cost figures for various duty cycles of operation. If the duty cycle cannot be estimated, the 100 percent duty cycle operating cost figure should be used.

Step 4: Determine total cost of operation by RF heating. To the operating cost of the RF generator must be added the labor cost for operation and the cost of accessory equipment, such as fixtures, conveyors, or automatic handling equipment. Where a very careful analysis is being made, the cost of floor space and maintenance on accessory equipment can also be taken into account.

A. *Labor Cost.* No chart is needed to supply labor cost. Merely consult your own wage scale and assume that not more than one operator per generator is necessary to carry on production. In some applications, the operator of existing equipment can also operate the RF generator in a scheduled time cycle and no additional labor need be added. Where semi-automatic or continuous conveyorized work handling equipment is involved, your labor figure should be reduced accordingly.

B. *Accessory Equipment Cost.* This is probably the most difficult item to estimate with a reasonable degree of accuracy. However, data has been compiled from cost analyses on numerous applications and is given in table form in Fig. 3.

To use this table, first determine the type of loading and the operating procedure necessary to obtain the production rates desired. From the tabulation, the cost range is obtained for the type of work-handling equipment necessary. Select a relative cost from this range, based on whether the application is the simplest or the most complex within the range selected.

Contingent Factors

Such factors as supplementary heating or drying air, oven type enclosure, complexity of shielding, transmission lines and tuning networks must be taken into account.

If in doubt regarding selection of a suitable cost figure from these tables, it is usually best to select a value somewhat above the average figure in any one range. A quick study of generator size and the time cycles involved —as covered in Step 2—will show the degree of complication involved in the work-handling equipment.

Once the value of the accessory equipment has been selected, it should be turned into dollars per hour of amortization cost, based on any selected period for amortization. In the case of the RF generator, a time of 30,000 hr. was used to arrive at the amortization cost. It is suggested that this figure be used for all work-handling equipment not of the hand operated type. For hand operated type equipment involving simple fixtures and similar devices, a figure of 10,000 hr. will give average conditions.

C. *Factory Floor Space.* Where it is desired to include factory floor space in the analysis of operating cost, the following figures may be used:

Generator Rating Kw.	Average Floor Space Sq. Ft.
2	25
5	30
10	40
20	85
50	160
100	225

Step 5: Interpret and compare RF cost with cost of other processes. The total cost of operating the RF equipment is the sum of generator operating cost (Step 3) and labor and accessory equipment amortization cost (Step 4). This cost should normally come out in dollars per hour of operation.

In all cases this should be translated into cost per piece, cost per pound or cost per cubic foot, as dictated by the product being handled.

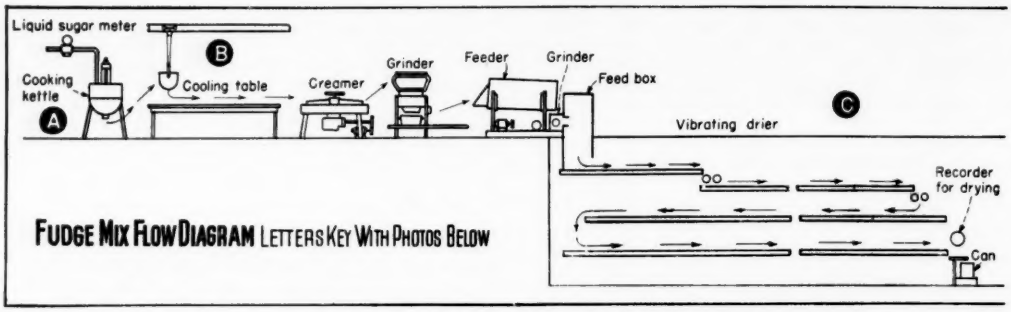
Comparing Costs

Finally, this figure should be compared with similar figures of cost on other methods or processes, either already known or contemplated, which will provide the same production rate. Here, care should be taken to see that comparative cost data are of equivalent accuracy to permit reasonable results.

If this comparison shows a substantial saving by the use of RF heating, the problem can then be presented to the RF heating engineer with confidence that, if he finds it technically feasible, you have a very worthwhile application.

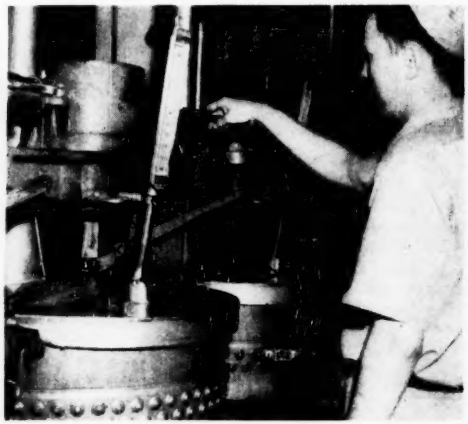
On the other hand, if the figures show other methods to be cheaper, then the application should be seriously questioned, or even definitely discarded, at least for the time being. Future developments and changing trends in equipment and processes may one day make such applications economically sound.

Then, of course, there is the case where analysis shows rather close competition between RF and other methods. In such instances, you should probe further into the possible savings in floor space, improved working conditions, and the ever important possible improvement in product quality.

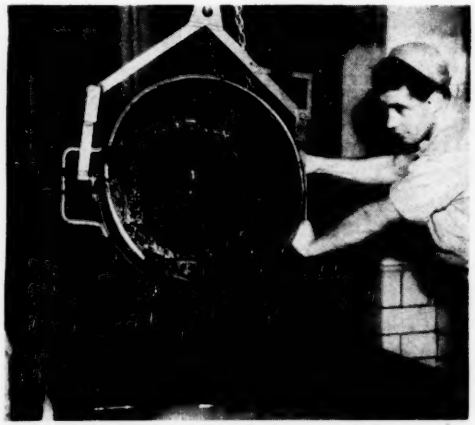


FUDGE MIX FLOW DIAGRAM LETTERS KEY WITH PHOTOS BELOW

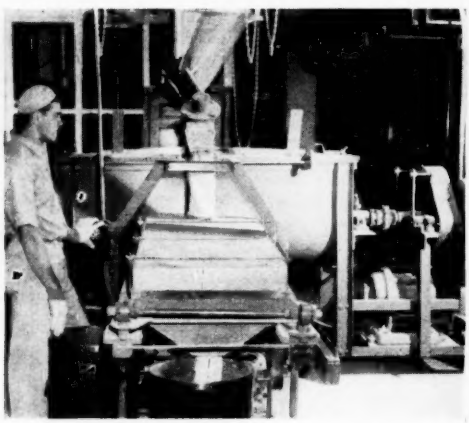
COOKED FUDGE is creamed, dried, ground, mixed with dry ingredients, and sifted, then filled into cartons and wrapped



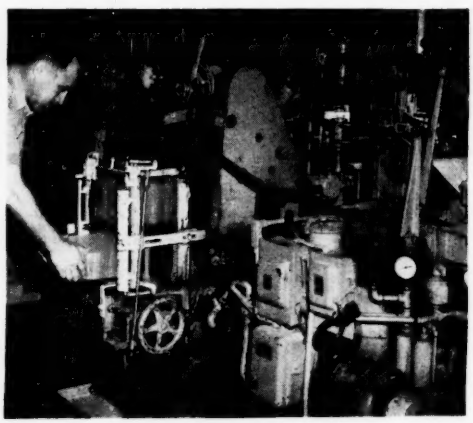
A **COOKING KETTLES** are equipped with meters for dispensing liquid sugar into process. Installation saves material handling, smooths operation, and cuts costs.



B **CHAIN HOIST** carries cooked chocolate sirup, which is poured onto stainless-steel, water-jacketed cooling slab. Mix is then cooled before it goes to creamer.

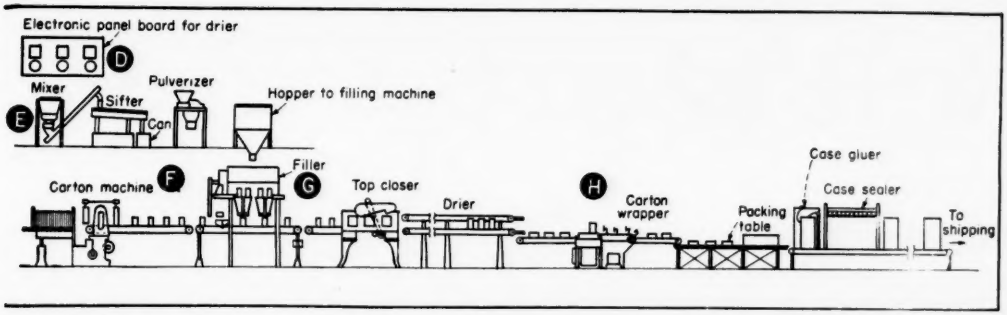


E **MIXER** blends added dry ingredients with mix. Sifter screens material to proper size before it is put in hoppers that feed automatic packaging lines on floor below.

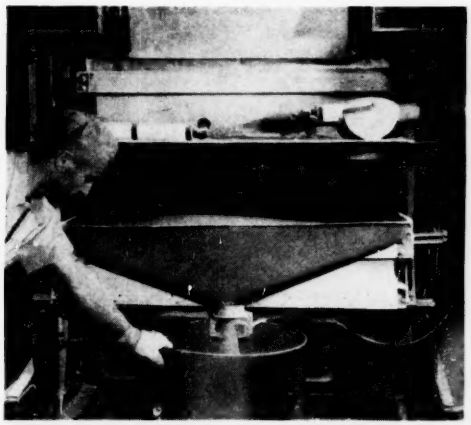


F **PACKAGING MACHINE** automatically forms paper-lined cartons. It cuts paper from roll, forms a bag, sets up knocked down cartons, and inserts bag into carton.

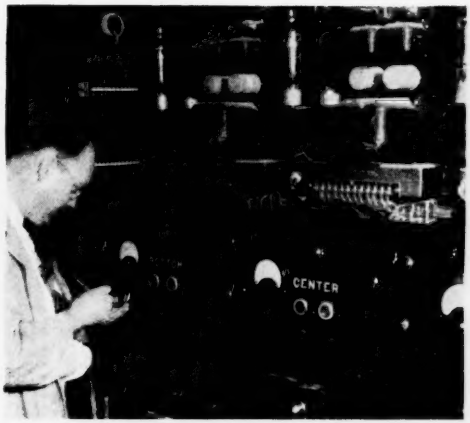
New Practices "Up" Output of Prepared Food Mixes



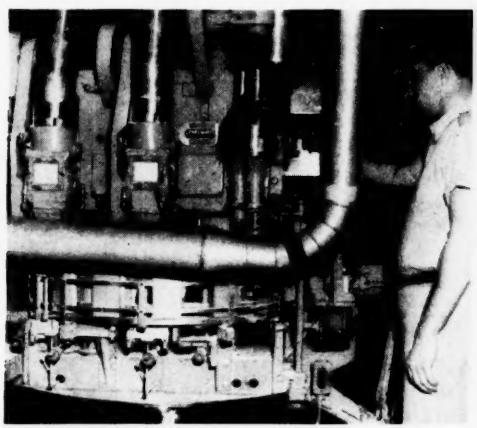
with self-sealing film. All steps are efficiently correlated.



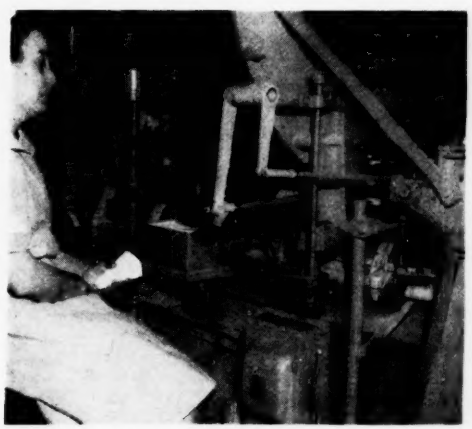
C CONTINUOUS DRIER, with its drying pans equipped with electromagnetic vibrators, keeps ground particles in constant motion to prevent them from lumping.



D ELECTRONIC CONTROL unit for continuous drier assures steady flow of mix, regardless of load. Thus idling time is cut on machines farther along line.

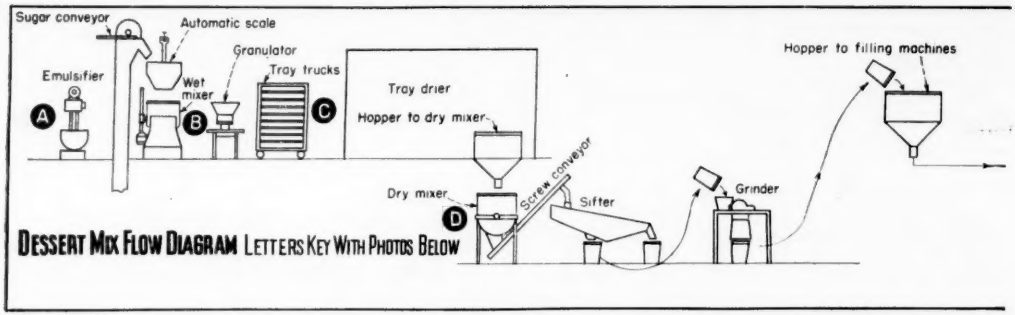


G CIRCULAR WEIGHER scales and fills chocolate- or penuche-flavored quick-fudge mix into cartons. Rate: 60 a min. Top flaps of cartons are glued and then sealed.



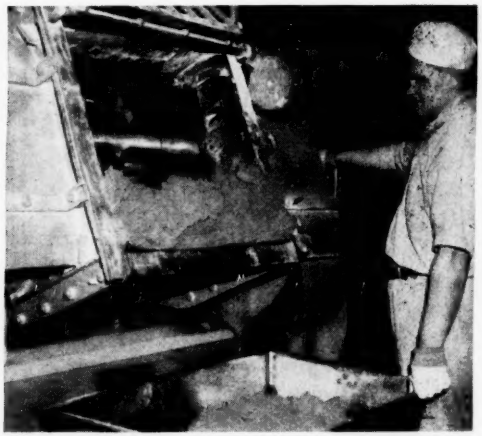
H WRAPPING MACHINE applies special, self-sealing wrapper over cartons. Machine is an improvement over former wax sealer that required frequent cleaning.

Quick picture of fudge-mix processing above. **(Dessert-mix line on page 78. Text page 80.)**

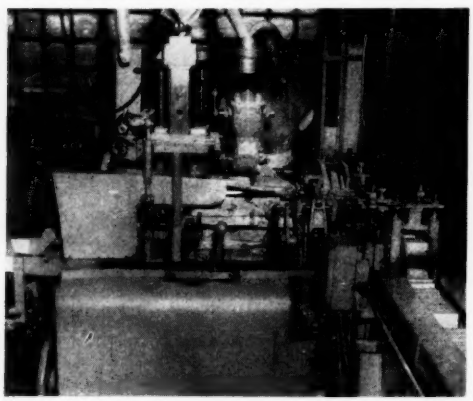


FOUR TYPES of "Junket" brand dessert mixes are processed on the same production line, then are automatically

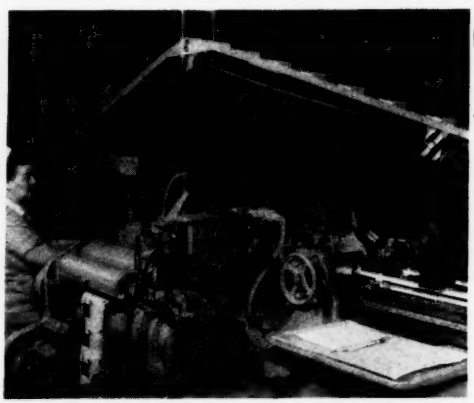
A **HOBART MIXER** prepares color and flavor emulsions in first step in the manufacture of "Junket" rennet powder, freezing mix. Danish dessert, and sherbet mix.



B **HIGH-SPEED MIXER** coats sugar with color-flavor solution. By using some fine sugar in formula, mix particles are more uniform in size and caking is reduced.

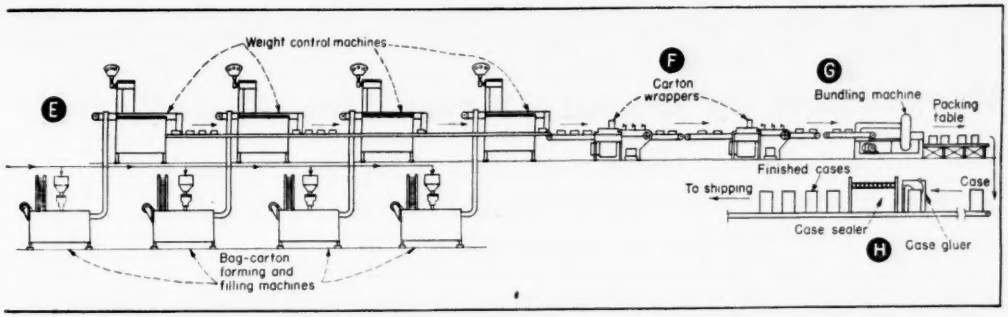


E **PACKAGING** follows sifting and grinding. Machines form satchel bags, fill, and crimp them. Bags are inserted into cartons that are glued and then sealed.

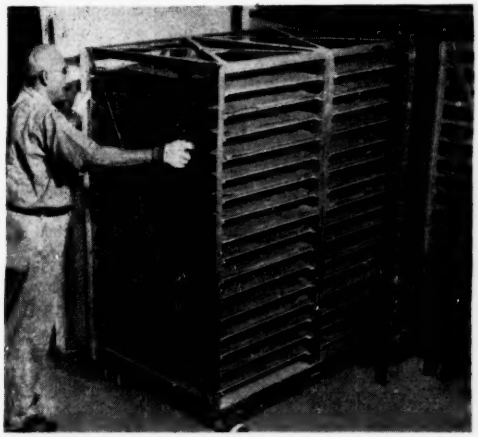


F **WRAPPING MACHINE** applies heat-sealing wax to laminated foil, which is then wrapped over cartons and heat-sealed at rate of about 75 packages per minute.

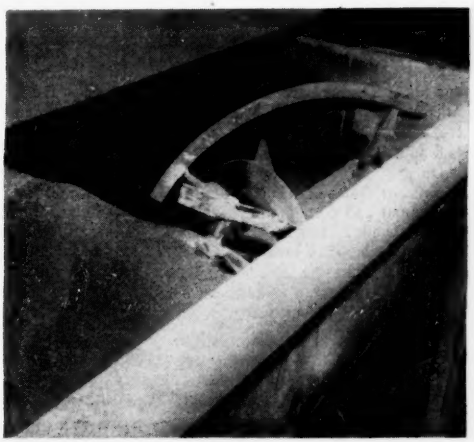
New Practices "Up" Output of Prepared Food Mixes (Contd.)



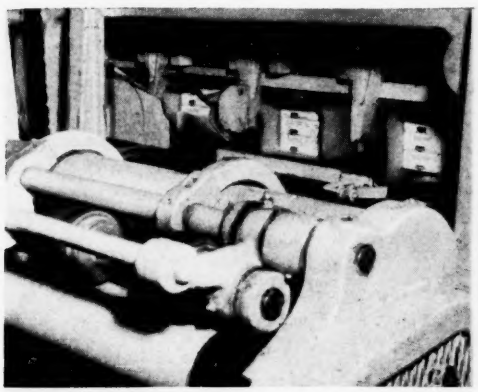
packaged by high-speed machines. Smooth flow is emphasized in operation.



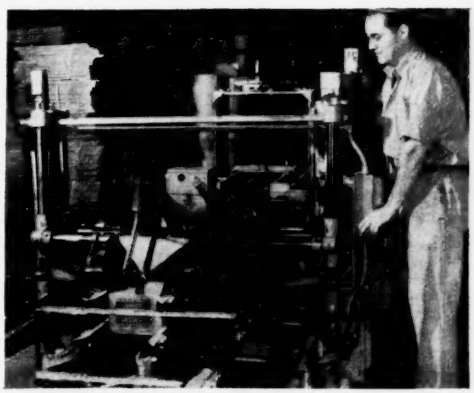
C RACKS containing wet mix are loaded into batch driers, where they are kept at 120 deg. F. from 1½ to 6 hr., depending upon kind of flavor added to the mix.



D DRY MIXER blends in other ingredients. Materials are added according to type of dessert mix being manufactured. Making of chocolate ice cream mix starts here.



G BUNDLING UNIT takes production from two wrappers, groups twelve cartons, wraps them in kraft paper, and applies printed, glued labels to wrapper folds.



H CASE SEALER automatically puts glue on case-flaps and then closes containers, which are finally conveyed to the shipping department or held in storage.

Quick picture of dessert-mix processing above.

(Text on next page)

New Practices "Up" Output of Prepared Food Mixes (Contd.)

Candy and dessert maker's experience demonstrates how production can be expanded by installing continuous lines, adopting automatic methods of handling bulk raw materials, and improving process formulas

JOHN V. ZIEMBA
Assistant Editor,
"Food Industries"

Greater efficiency keynotes current operations in the highly sanitary plant of the "Junket" Brand Foods Div. of Chr. Hansen's Laboratories, Inc., at Little Falls, N. Y., where quality candy and dessert mixes are manufactured. This improved efficiency has resulted from increased output of machines and an enlightened personnel program.

Output has been augmented by equipment that makes some operations continuous and permits automatic handling of bulk materials into processes. To further step up output, some formulas and processes have been simplified, others revised to make them more effective. And the company machine shop has shortened repair time and prevented—in most cases—shutdowns during production.

Operations that have been made continuous are the lines making precooked fudge mixes and those making dessert mixes. Products manufactured on the dessert-mix line are Danish dessert, sherbet mix, rennet powder, and freezing mix. On the fudge-mix line, installation of a continuous drier has resulted in a 25 percent reduction in drying time, and the packaging line has been completely mechanized. High-speed, continuous packaging is also a new feature of the dessert-mix line.

Drying Made Continuous

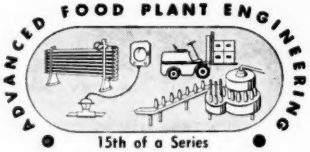
A noteworthy installation that has cut down drying time on the fudge-mix line is the electronically and thermostatically controlled drier. Aside from reducing drying time, it has also made continuous drying successful.

To speed drying, pans that make up the fudge drier are equipped with magnetic type vibrators. These vibrators permit better contact of mix with pans than has heretofore been accomplished. Thus, all particles receive equal heating from the pans. The vibrators also keep the particles of fudge mix in constant motion, preventing them from lumping, and allowing them to dry faster.

The drier is enclosed in a special room, kept at 150 deg. F. First unit on the drier is the rotary feed drum, into which the fudge is fed. Next, the mix travels on three tiers that are constructed of a series of hot-air-jacketed, stainless-steel, magnetic-vibrator pans. Each tier, 65 ft. long, empties onto the tier below.

The fudge, broken up into small pieces, is fed into this drier by means of a rotary drum feeder. After traveling along on one pan and being partly dried, the fudge passes through a set of rollers which crushes any large lumps that might be present. Next, the fudge drops to the second tier of pans and the drying continues until, at the end, the powder is discharged and the mixture content of the mix has been reduced to 1½ percent.

Other production-line installations that permit high-speed, continuous performances are the packaging lines.



Chocolate and penuche fudge mix are packaged by a medium package maker, duplex circular weigher, and a straight-line top-closure machine. Other continuous-type machines incorporated into this line are wrapping machines and a case gluer and sealer.

Outstanding development that has sped production on this line is the new carton wrapping operation. Now, by using a self-sealing, laminated-foil wrapper, several awkward handling and time-consuming steps are eliminated. For example, it is no longer necessary to chop heat-sealing wax from barrels and feed it to a wrapping-sealing machine. Nor is it necessary to melt and to apply the wax to the wrapper—later to clean machine parts where accumulations of wax has fouled up sealing operations.

"Junket" rennet powder, freezing mix, Danish dessert, and sherbet mix are packaged by automatic machines. Weighing freezing mix, Danish dessert, and sherbet mix packages is automatically done by weight-control machines. Packages are then put up into bundles of one dozen each by standard bundling machines. These bundles are next inserted into corrugated cases, and finally glued and sealed.

Raw Materials Handling

Throughout the plant, there has been a switch to mechanized handling of bulk raw material. Automatic handling, for example, has provided a steady flow of liquid sugar and bulk sugar into processes.

On the fudge line, a method of metering liquid sugar into cooking kettles is the next thing to a continuous operation. The meters are set to measure a given amount of sirup. And when the operator opens the meter valve, only a measured quantity of sirup is delivered into the kettles.

This in-plant handling method has many advantages. Among them are lower sugar losses, better sanitation, smoother and easier operation, and greater savings in labor and storage space.

On the dessert-mix line, the bulk sugar handling operation features an automatic sugar conveying system which carries the sugar from the 5,000-lb. bins in the basement up to the mixers on the third floor. Here, the weighing-to-process equipment scales and dumps bulk sugar automatically into the mixers used on the dessert-mix line.

Process-Formulation Changes

In addition to equipment changes, improvements have also been made in formulations and processing techniques in order to step up production.

Changes made in the formulas were ones of substitution. One such change on the dessert-mix line came through better-materials research: The drying of powders was greatly accelerated by changing its physical characteristics.

Formerly, large lumps were present or the individual particles in the mix were comparatively large, thus drying was greatly delayed. But by changing granulation methods and by substituting part of the sugar with sugars

of small particle size, the surface of the powder has been greatly increased to cut the drying time. In some cases, drying time has been reduced from 3 and 4 hr. to only ½ hr. This, of course, increased the capacity of the drying equipment, and has thereby increased the production.

In other cases, drying time has been shortened by substituting faster-drying stabilizers for those that hold moisture more tenaciously.

Two process changes have resulted in greater efficiencies on the fudge-mix line, with one simple fudge-line creamer modification saving considerable time and increasing output.

Originally, after a batch of fudge mix had been creamed, all fudge particles adhering to the creamer had to be removed. This step naturally took some time. It was found, however, that these particles that remained in the creamer did not interfere with the quality of the next batch. Also, these particles speeded creaming of the next batch because they served as "seeds" for sugar crystallization. In this way, the capacity of the creamers has been increased at least 25 percent.

Second, there has been a change in the mixing operation. Now, certain of the ingredients are added to the creamer instead of to the cooking kettle. This modification resulted in a product that could be broken up more easily and with less tendency of lumping. Result has been quicker drying and better granulation.

To keep equipment working steadily, the company maintains a well-equipped machine shop. Benefits of this shop are many. Among them are: (1) Shortened time for repairing machines, (2) prevention of shutdowns on lines by timely inspections and repairs, and (3) construction of special parts to increase machine efficiency.

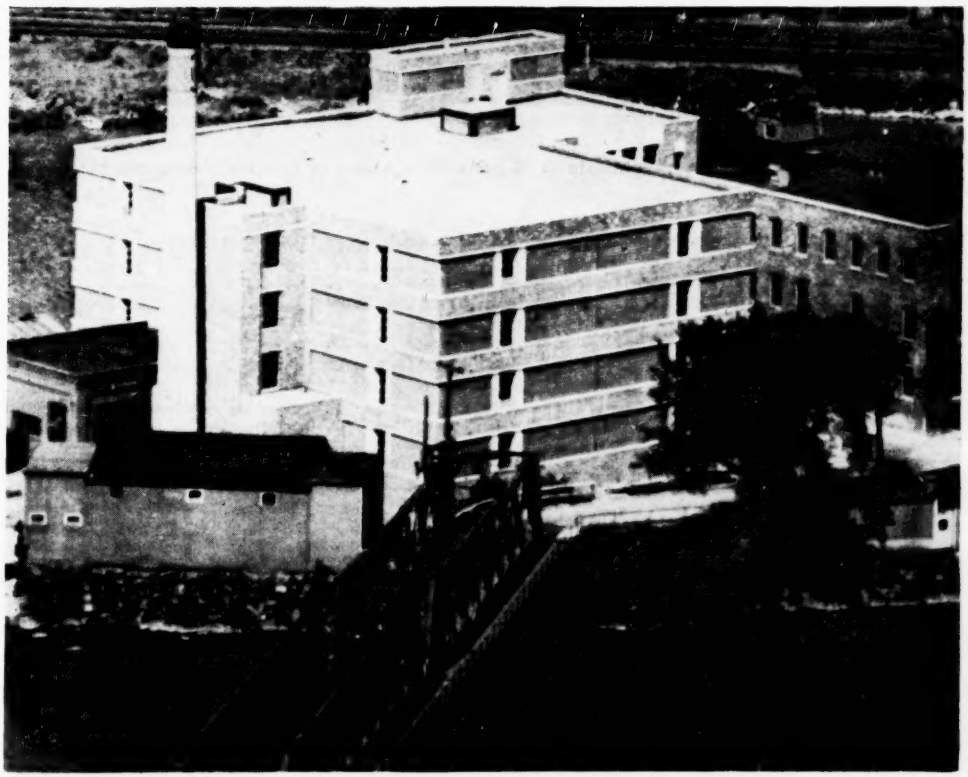
In addition, experience gained through the activities of the machine shop has led to improvements in the design of standard equipment.

Increased worker benefits and improved working conditions have resulted in better cooperation and greater productivity from the workers. The personnel receives many benefits from the company—hospitalization, lay-off pay, pensions, and group life insurance policies equal to a worker's annual salary.

The company has raised morale among its employees by its improvements in working conditions. Jobs that formerly required heavy manual labor have been lightened, particularly through the installation of mechanical devices that make physical efforts easier. The heavy lifting is no longer done manually, but mechanically. Also, the liquid sugar installation has done away with the handling and lifting of large quantities of sugar.

In nonproductive sections of the plant, a wide range of facilities is provided for the employees. There is an attractive lunch room where workers obtain hot lunches at low cost. Lockers and washrooms are adjoining to operating areas. First aid facilities are readily accessible from production areas. And a modern laboratory and offices are located adjacent to the plant addition.

The new, ultra-modern building addition is specially designed for good working conditions as well as production. It is constructed of reinforced concrete and glass bricks. The interior walls are of tile and the floors are made of maple. Air conditioning units provide year-round comfort, thereby increasing worker's efficiency.



MODERN, concrete-and-glass-brick plant addition was specially built for sanitary production. It is air conditioned.

A. Printing gone, foil untouched.

B. Foil beginning to loosen.

Ordinary 6 percent caustic solution fails to completely remove aluminum foil labels from beer

A. Foil loosening from paper.

B. Foil practically gone.

. . . but when sodium alkyl aryl sulphonate (0.18 percent) is added to solution, labels are effectively

Alkyl Aryl Sulphonates Improve Bottle Washing

These wetting agents facilitate rinsing and draining and give all glass containers a better appearance. They are effective in waters of varying hardness

ROBERT I. TENNEY
President, Wahl-Henius Institute, Chicago

In food plants, bottle-washing operations require much more than mechanical removal of visible dirt. And wetting agents can play a specific role in doing a proper job. This fact has been confirmed by studies made by Wahl-Henius Institute in its Chicago laboratories and by observations in the plants of its clients.

These studies and observations—started before the outbreak of World War II and renewed after its end—point to improved washing methods, particularly where free-rinsing and draining are desired in order to obtain a glass container that is microbially sterile and free from a cloudy, dull appearance.

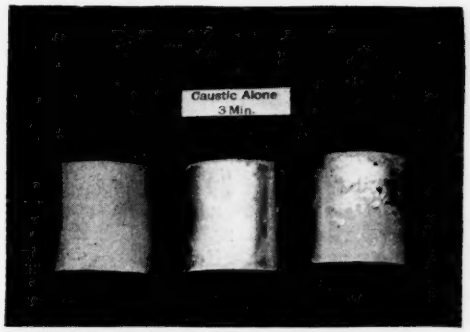
Removal of labels, especially foil labels, has been included in the studies because of the trouble they give in the cleaning of beverage and similar re-use bottles and glass containers.

The plant studies were made in five geographical locations, from Buffalo, N. Y., across the country to San Francisco. This territorial scope has included water variations ranging from relatively low hardness of the Great Lakes and the Pacific Coast areas to the extreme hardness of Indiana water, with Rocky Mountain water occupying an intermediate relationship.

Repeated tests and observations have showed that comparable, satisfactory washing results are obtainable by the use of selected wetting agents, regardless of the composition of the water used. Also, scale formation in the washer and rinser was modified in the hard water areas, minimizing the maintenance work and expense associated with hard scale formation. Chiseling off and auguring out the scale was eliminated in favor of less severe and less potentially damaging treatment.

Increase in microbial kill, control of algae growth, and increase in brilliance of bottles were other advantages observed through the use of the specific wetting agents belonging to the alkyl aryl sulphonate family.

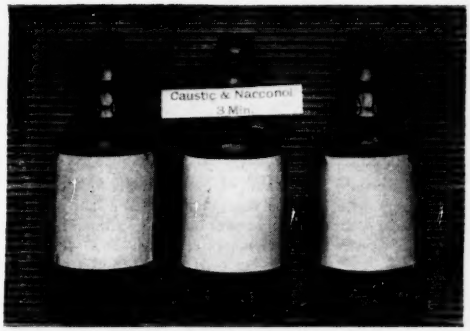
Although the studies were made during the washing of beer bottles, the



C. Foil practically gone.

D. Foil gone, but paper intact.

bottles in 6 minutes at 150 deg. F. . . .



C. Foil gone, paper intact.

D. Paper practically gone.

loosened and readily wash off

results are applicable in other fields of food manufacture and packaging where aseptic conditions must be imposed to avoid deterioration of the food after bottling. Beer is a good example because of its perishability and because the brewer cannot afford to be less careful in the washing of the bottles, into which he packages his product, than he is with the making and handling of his beer.

Faulty Bottling Gives Trouble

Through experience, brewers have learned that the manner in which beer is treated during bottling operations has much to do with its ultimate quality when consumed. Those who have experienced spotted spoilage in a batch of otherwise excellent beverage know too well the penalties of improper or faulty bottling—probably the result of inadequate washing of the bottles.

Every effort is made throughout a brewery to insure biological purity or sterility of the beer delivered to the bottle-house. Process air is filtered and sterilized. Container vessels are coated with smooth, inert linings so that undesirable bacteria cannot escape the cleansing measures. Hoses, equipment and utensils are washed with antiseptic solutions. Finally, the beer is filtered, usually through both diatomaceous earth and pulp, to give brilliance and to remove all but a trace, at most, of the viable yeast left from the fermentation process.

All of these safeguards can be—and too often are—nullified by the use of improperly cleaned bottles.

Brewers' problems with respect to bottle-washing are quite similar to those of other food and beverage processors who re-use bottles. Dairies, carbonated beverage plants, and breweries wash billions of bottles each year. Each has common problems and each has specific problems. Equipment and materials for washing bottles are of common design and composition, but the dirt to be removed may vary considerably.

An early Greek philosopher defined dirt as "matter in the wrong place." This expression is certainly an apt one for the dirt which must be removed from bottles returned to a brewery. The washer is expected to remove practically all kinds of matter from the bottles.

Pieces of other bottles, beer residues, mold growths, glue, paper, metallic foil, splinters, oil, cigar and cigarette butts, dried insects and bent crowns are but a few of the common items to be removed before the bottles are again acceptable for use. Simultaneously, the bottles must be sterilized and rinsed free of scale and film before a freely drained container without a dull, veiled appearance is produced.

The dirt in the bottle may be either loose or it may be firmly attached to the glass as a hard film not easily penetrated by the cleansing agent. Removal of dirt may, therefore, require a complex physico-colloid-chemical action instead of merely a physical action, depending upon the composition and state of the substance to be removed and of the cleansing agent used.

Buchanan and Levine's[1] classical work in the beverage field has been of great assistance to those who wash bottles. They and others have de-

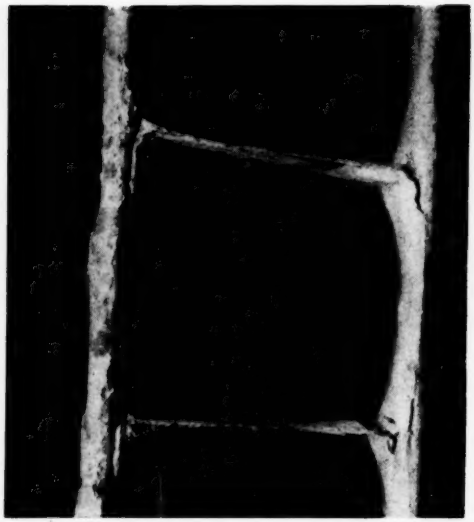


FIG. 1. Soaker pockets are heavily coated with scale after one year of use in customary caustic-soda ash solution.

FIG 2. Close-up of a surface of one of the soaker pockets reveals the nature of the heavy scale deposit.

scribed and compared the various substances employed in these operations. Single alkalis are sometimes used, but more often alkaline mixtures are preferred. Caustic soda, soda ash, trisodium phosphate, tetra-sodium pyrophosphate, sodium-meta-silicate, sodium borate, sodium aluminate, and others, have been employed in various mixtures with each other.

First Use of Synthetic Detergents

About 1935, experiments were started to measure the utility of the then-newly-developed wetting agents, or synthetic detergents, with respect to bottle-washing. It was thought that free-rinsing, faster penetration of the dirt and improved dispersion of the removed substance would result. The early tests which the author observed in both laboratory and plant showed clearly that many of the surface-active wetting agents then available could not be used either alone or with alkalis and that the best of them were most efficient when used with caustic soda.

As a class of compounds, the synthetic detergents have found many uses. It was obvious that they should be tested by the washing of bottles for beer and ale, carbonated beverages, and milks. The results were so promising that only World War II prevented the earlier inclusion of such agents in commercially prepared bottle-cleaning compounded alkalis. Suitable materials are now available, either alone or as ingredients of these specially prepared compounds.

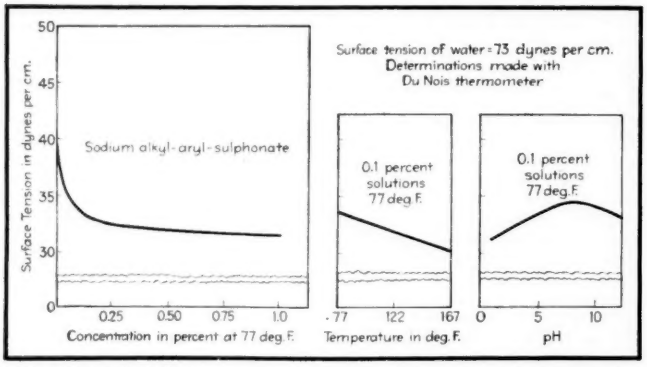
Organic derivatives of fats or oils can promote free-rinsing, but they leave a film of surface-active material in the bottles which adversely affects the foam of beer. This is true of most of the cationic agents and many of the anionic ones as well, although there are members of each class which do not harm beer foam. In this respect, the washing of beer bottles may be more critical than the handling of bottles for other beverages and liquid foods.

To meet the requirements of the brewing industry, a synthetic detergent—

1. Must not decompose upon contact with caustic soda.
2. Must remain stable at temperatures up to 180 deg. F.
3. Must have water-soluble metallic salts.
4. Must possess high and persistent surface activity at low concentrations.
5. Must be non-corrosive.
6. Must not alter the brilliance, flavor, color or foam of the beer.
7. Must be available in commercial quantities.

Since greases and oils comprised of saturated aliphatic hydrocarbons had been found to have no effect upon beer foam, the water-soluble derivatives of the hydrocarbon solvents appeared to offer the most promise in the early investigations within this field. Work undertaken jointly by the National Analine & Chemical Co. and Wahl-Henius Institute found among this group a family of detergents which did meet the first six of the requirements outlined.

By 1939, production of the alkyl aryl sulphonates had reached a point where even the seventh requirement was met, but wartime demands pre-



SURFACE TENSION of water solutions rises with each increase in pH. But it drops 22 percent with addition of only 0.05 percent alkyl aryl sulphonate.

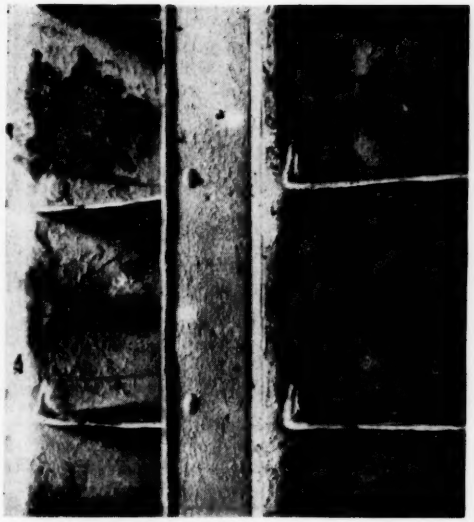


FIG. 3. Only a slight coating of scale forms in soaker pockets after 18 months' use of alkyl aryl sulphonate.

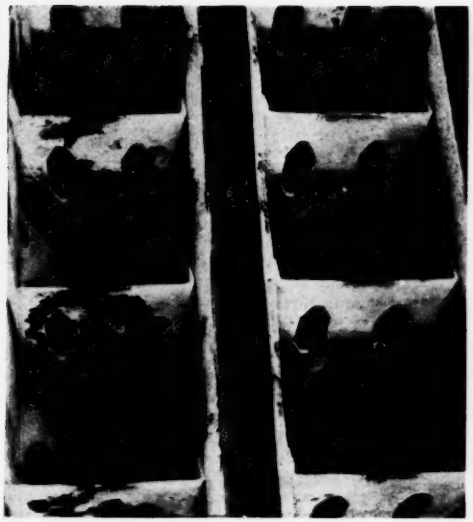


FIG. 4. Acid-cleaned soaker pockets have only light, easy-to-clean scale after 18 months with sulphonate agent.

cluded their availability for use in bottle-washing. Today, the compounds belonging to the sulphonate family are made by several manufacturers and are readily available.

Sulphonates Found Effective

The investigation and subsequent commercial development soon centered about the sodium salt of an aromatic sulphonate carrying a hydrocarbon side-chain of a substantial number of carbon atoms. This was found to be a powerful wetting agent and surface tension depressant. Its activity is retained in hot caustic solutions. It is noncorrosive, and its heavy metal salts are water soluble. It was found to be harmless to beer and non-toxic to human beings, and it was therefore subjected to both laboratory- and plant-scale testing simultaneously.

This compound, as well as most organic detergents, works primarily through its ability to reduce the surface tension of water. Hence, the ability of the solution to form films rather than drops. A liquid having a high surface tension forms large drops with a tough "skin," whereas a liquid possessing a low surface tension does not have the strength to form drops and spreads over a surface as a thin film.

Fresh caustic solutions such as those used in the soaking compartment of bottle-washers frequently have a surface tension of 65 dynes per cm., compared to 73 dynes per cm. for water. Thus, the soaker solution will tend to form large drops that will maintain their identity, though not as readily as will water alone. If any surface-active agent is added even in small quantities, the surface tension is lowered.

Below 35 dynes per cm., drops no longer form on the bottle surface because the surface film is not strong enough to support a drop. The liquid remains in a free-flowing film that drains smoothly and uniformly. Thus, free-rinsing is promoted by the use of a wetting agent.

This lower surface tension also assists the penetration of the cleansing agent and tends to "lift" the dirt films from the bottle. It also aids in the emulsification of, or dispersion of, the dirt in the solution, so that it will leave the bottle clean.

The initial plant tests of alkyl aryl sulphonate took place in two breweries having different water conditions. One plant in Buffalo, N. Y., used water from the Great Lakes, while the other brewery used hard water from the Indiana limestone area in the northern part of that state.

Since then, the author has observed the use of such materials in at least 30 plants throughout the country. No estimate is available as to how many breweries, carbonated beverage plants, or dairy plants are using such compounds although the number must be high, since several alkali compounders now add alkyl aryl sulphonate to their mixtures. The material has been used in production lines for bottle-washing since 1939 and in more and more plants since the end of the war.

Effect on Surface Tension

Among the observations that have been made of this practice is the fact that a concentration as low as 0.15 percent is sufficient to impart excellent wetting and rinsing properties to a soaker solution containing 5 percent caustic soda. The chart accompanying this article illustrates the reduction of surface tension under the influence of the sodium alkyl aryl sulphonate that is known by the trade name of Nacconol NR. Other members of this group perform similarly, and their action in caustic follows the same trend.

It is significant that concentrations above 0.25 percent are uneconomical, since the added depressing effect is slight for even a four-fold increase

COMPOSITION of Scale Deposit on Bottle-Soaker Chain

Characteristics and Composition	Scale Deposit, Caustic Soda and Soda Ash	Scale Deposit, Caustic Soda and Nacconol NR
Color	Light Grey	Dark
Condition	Hard and thick, Removed by hammering, Hard to grind	Dusty and thin, Easily scraped off, Easily ground
SiO_2	0.94 percent	2.60 percent
FeO_3	0.36 percent	0.48 percent
Al_2O_3	1.94 percent	12.32 percent
$CaSO_4$	0.71 percent	none percent
NaCl	0.17 percent	0.66 percent
$CaCO_3$	88.30 percent	45.20 percent
$MgCO_3$	4.20 percent	13.40 percent
$Ca_3 (PO_4)_2$	(none)	6.77 percent
Organic matter, by difference	3.38 percent	18.57 percent

in agent concentration. Typical surface tension measurements in dynes per cm. are:

Water	73
Used soaker solution of 6 percent caustic	41 to 56
Fresh solution of 6 percent caustic, plus 0.18 percent Nacconol NR	31 to 33
Same solution after one-day's use	33 to 35

Thus, there is some loss of the wetting agent through absorption by the pulp, mechanical carry-over, or decomposition.

Caustic Carry-Over

Because of the freer rinsing, it would be expected that less caustic carry-over would occur in the bottle as delivered to the filling machine. No actual measurements of this ability are available, since brewers strive always to keep this at a minimum. However, in every observed case in which there was an occasional caustic carry-over, it was eliminated by the use of a wetting agent of this type. In washing machines which provide two or more clear water rinses, there should never be a caustic residue in the bottles washed in solutions containing alkyl aryl sulphonates.

Labels applied with "ice-proof" glues are capable of holding to bottles in ice water but are soluble in hot caustic. Wetting agents assist in giving a greater penetrating effect to the soaker solutions. Having a lower surface tension, the solutions are able to creep in through smaller openings. Hence, action in the soaker is accomplished more rapidly in the presence of a wetting agent.

This was clearly shown in an experiment reported by Yanick, Morgan and Tenney[2] in which aluminum foil labels were employed. These foil labels are hardest of all to soak from beer bottles, because the metallic coating must be removed before the paper can be penetrated by the solution. Apparently, soaker solutions containing a wetting agent not only dissolve the aluminum quickly, but are also able to creep in more readily from the side and under the label, releasing the glue more promptly. Picture panels at the beginning of this article are taken from this report. The aluminum salt of the agent is quite soluble.

Some labels are printed with inks insoluble in caustic soda. The paper on which the labels are printed disintegrates and pulps-up in the soaker, but the lettering may be seen—alphabet soup style—floating in the soaking compartment. If these ink particles are carried in the bottles to a cold rinse, they congeal and stick to the bottles, causing a very annoying difficulty—black specks in the beer.

While alkyl aryl sulphonates will not dissolve this ink, they will, nevertheless, promote a free drainage as the bottle passes from one compartment to another, thereby diminishing the chances that any of the particles will remain in a bottle by the time it is exposed to a cold rinse.

Scale Removal

Plants using the wetting agents described have noted either a softening or a removal of the scale on equipment. In the Indiana plant participating in early tests, measurements were made over an 18-month period. Initially, the scale on equipment was dense and hard. It could be removed only by hammering or by the action of acids. Fig. 1 and 2 show the condition of the soaker pockets after one year's use of a caustic-soda ash compound. The scale was thick enough in some portions to interfere with proper functioning of the equipment.

Tared metallic strips, attached to the chain and removed for weighing periodically, demonstrated that the scale was actually removed through the use of a wetting agent, but at a slow rate. The speed of removal was not the same for all portions of the chain and presumably depended upon the nature of the surface and the length of exposure to the soaker solution containing the agent.

Fig. 3 shows the same chain after 18 months' use of the wetting agent. One will note the thinner coating and the absence of scale in some areas. Fig. 4 is a portion of the same chain which has been cleaned with acid down to bare metal and then operated 18 months, using alkyl aryl sulphonate.

Other breweries have noted that the use of a wetting agent does not prevent the deposition of a scale, but the scale that does form is soft and powdery when dry. When it reaches a certain thickness, it breaks off almost down to the metallic surface. A greater amount of organic matter is occluded in the scales deposited in the presence of a wetting agent, and this tends to promote a more spongy scale.

A comparison of the composition of two scales removed from a soaker chain (see table) will show the changes made in the chemical composition by the use of a wetting agent. Each scale deposit is approximately 18-months old. The original scale was chiefly calcium carbonate, while the scale formed in the presence of the wetting agent contained higher quantities of magnesium carbonate, organic matter, and alumina. This latter substance may have been introduced through the increased usage of aluminum foil labels during this portion of the test.

Biological Assistance

Pediatricians seeking to control infant dermatitis due to soap residues in the clothing had been successful by using the wetting agent found best for brewery use. A logical step in the investigations was the inclusion of tests of the agent's biological activity. Scales[3] reports the enhancement of the germicidal properties of chlorine solutions by the inclusion of alkyl aryl sulphonates. Tenney and Morgan[4] report that this substance exerts a definite action against *Staphylococcus aureus*, which is killed within 3-min. contact with a 0.2 percent solution at 77 deg. F.

Tests against mixed cultures of yeast, mold, and bacteria commonly met in brewery practice demonstrate the agent to halve the time for caustic alone to effect a complete kill of all organisms. *P. glaucum* is not killed until after a 30-min. exposure to a 2 percent caustic soda solution at 95 deg. F. The same organism is killed in less than 12-min. if 0.15 percent alkyl aryl sulphonate is added. No organisms of the mixed innoculum survived 4-min. exposure at 140 deg. F. to 2 percent caustic plus 0.15 percent of the wetting agent.

All members of this group of compounds have this ability to a varying degree. These data apply to the sodium salt, Nacconol NR. This property is not necessarily connected solely to the surface activity of the compound. Not all wetting agents possess properties which make them valuable as sterilizing agents. The sulphonate group undoubtedly plays a major role in this added benefit of this series of compounds.

Algae Control

While not strictly a question of bottle-washing, many bottlers have found the alkyl aryl sulphonates particularly advantageous in the control of algae growths and slime deposits within pasteurizing equipment. Water is circulated for re-use for some time in this machinery and algae growths are a common source of trouble for the spray-type design.

The addition of 0.1 percent of the wetting agent or more will control this adequately and still will not lead to excess foaming. If hard water is used, the film of salt scale is also reduced by this practice.

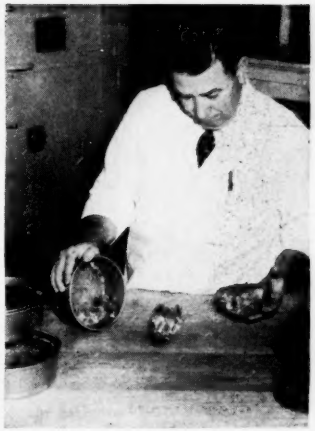
Foam Tends to Break Up

All surface tension depressants tend to produce foam in solution. The alkyl aryl sulphonates are no exception, although they do not "suds" as much as soap or some of the other agents designed more specifically for foam

(*Turn to page* 211)

No more pan cleaning . . .

. . . pan greasing . . .



. . . or "cripples" when—

Fruit Cakes Are Baked Direct in "Litho" Consumer Tins

BAKERS can take advantage of a new, economical, labor saving method of making fruit and other cakes—by baking them directly in lithographed, gift-type consumer tins, instead of in the standard baking pans.

The enamels used on these cans have proved durable and resistant to baking heat. None of the cans has shown any evidence of discoloration after a cake has been baked in it.

This new technic was developed by James A. King, director of the Nulomoline Testing Bakery, subsidiary of American Molasses Co., New York City. It completely does away with the use of baking pans, thereby eliminating the need of carrying a large supply of such pans in stock, and thus conserving floor space.

This saving will be especially welcomed by biscuit and cracker bakers who make use of the "holiday" pans only a few times a year, yet have had to give storage space to them around the calendar.

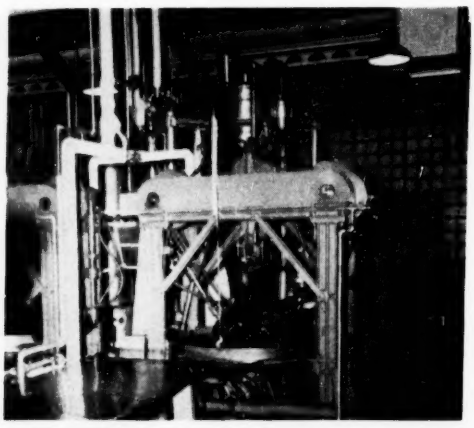
With the pans eliminated, operations are decidedly simplified. For there is no longer any necessity of scraping, washing, or greasing pans. The step of removing the fruit cakes from the pans after they have been baked is, of course, also done away with, likewise the individual wrapping and boxing of the cakes.

All bakers need do (lower photo) is scale the cake batter directly into the consumer tins—previously lined with greaseproof baking paper—then bake. Following cooling, the tins of cake may be given a final wrap in cellophane before delivery.

This direct use of consumer cans is estimated to reduce labor costs by one-fifth to one-quarter, depending on volume and variety in the fruit-cake baking operation.

In addition to time and labor saved by adoption of the new technic, the cakes are produced in a more salable condition. This is because "cripples"—cakes damaged in removing them from the pans—have been eliminated by baking batters directly in the final tins.

METAL WASTE CONTAINERS placed within easy reach of machine operators aid in keeping working areas clean.



ILLUMINATION is 20 to 30 foot-candles—from overhead fixtures, glass-block walls, and clear-glass windows.

PALLET STORAGE of ingredients simplifies handling, makes floor cleaning easy, cuts rodent harborage.

Plant Program for Workers Pays Off for Management

Candy maker's morale-building housekeeping plan not only reaps many labor-relations dividends but also cuts production costs and improves product quality

E. S. STATELER
Associate Editor,
"Food Industries"

Low labor turnover, relatively little absenteeism, a negligible accident rate, a high level of plant housekeeping, and voluntary observance of good sanitary practices—these are among the dividends being paid by the employee-relations program at F. & F. Laboratories, Chicago candy maker.

And these results are no accident. Instead, they are the benefits of a consistent, yet unobtrusive, company policy which has been followed since the company began making medicated lozenges and syrups in Chicago nearly 13 years ago.

Contributing factors are adequate lighting and ventilation, modern plant construction, mechanized operations, sanitary equipment, and morale-building employee facilities. These factors were given emphasis in the $1,500,000 expansion of production facilities completed in late 1947 for the manufacture of fruit-flavored hard candies.

Labor turnover has been of minor significance since the original Chicago plant was opened in 1936. During the intervening years, less than 5 percent of the employees have left the company for employment elsewhere, despite the higher wages paid in metal-working plants. Eighty men and women, ranging in age from 18 to 40 years, have comprised the personnel during the past two years.

Ninety percent of those who went into the Armed Forces have returned to the company. Those who did not return gave reasons other than dissatisfaction with employment conditions. Considerably more than half of the women workers have been with the company since the Chicago plant began operations.

Absenteeism during the past 10 years has been substantially less than 5 percent, for much the same reason that the labor turnover has been so low.

The company's consistent policy, as nearly as it can be expressed in words, is: "To provide the type of working conditions under which management itself would choose to work." Formulation of this policy began with the organization of the company, 19 years ago in Omaha, Neb., by its president, Morris Fox, a pharmaceutical chemist. The policy is so well-established now that Vice-Presidents Bernard and Robert Fox carry on the precedent of their father and actually work alongside the hourly wage earners.

In short, management personnel, as represented by the president, vice-presidents, and general manager, have carried out their duties and responsibilities in the office and in the production areas as company employee co-workers rather than as arbitrary dominating bosses. They have worked with the wage earners in the improvement of production practices and technics, also in the improvising of

temporary equipment and in the designing and building of permanent labor-saving machinery and production control devices.

This practice is no superficial gesture, nor is there any paternalism about the company policy. It is a practice of good business and good personnel relations. It has been highly influential in the continuous employment of the same personnel and in the development of a sense of ownership and responsibility on the part of the wage earners.

High level of the plant housekeeping is evidenced by the absence of litter, debris, scrap material or broken equipment anywhere in the production areas of the plant. Windows are kept clean and their ledges free from the waste paper, discarded hand cloths, and the like, so often dropped or thrown aside by careless workers.

The habit of tidiness on the part of the employees is aided and stimulated by management in various ways:

1. There are adequate and conveniently located receptacles for all waste and scrap materials, and these are systematically emptied to avoid over-filling.

2. All production areas—and out-of-way places and corners, too—are lighted to 20 and 30 foot-candle levels by means of clear glass windows fitted into glass-block upper walls, and by over-head fixtures of 250w. bulbs and 40w. fluorescent tubes at 8-ft. intervals.

3. Lower walls are of high gloss enameled-tile construction and light tan in color—easily cleaned and of pleasant tone.

4. Ceilings and doors are kept painted with a high-gloss white enamel applied yearly and cleaned every month between paintings. Painting of pipes, equipment and entryways is on a continuous schedule.

F. & F.'s Practical Policy:

". . . to provide the type of working conditions under which management itself would choose to work."

5. Hard, smooth surfaces of concrete floors make sweeping easy.

6. Systematic removal of empties and wrappings—that is, emptied label boxes or cartons, and broken cases and emptied containers or wrappers of ingredient materials and packaging supplies—avoids accumulations which encourage carelessness.

7. Broken or disabled equipment which cannot be promptly repaired on the spot without creation of a nuisance or interference with production flow, are removed to the machine or repair shop.

8. Crowding of equipment and congestion of working areas have been carefully avoided, thus the employees have ample working space.

Voluntary observance of good sanitary practices is shown by the way each operator keeps his particular machine and working area clean. The sides of cooking kettles are free from drippings, and other equipmeant is constantly kept free from either dust or sticky accumulations.

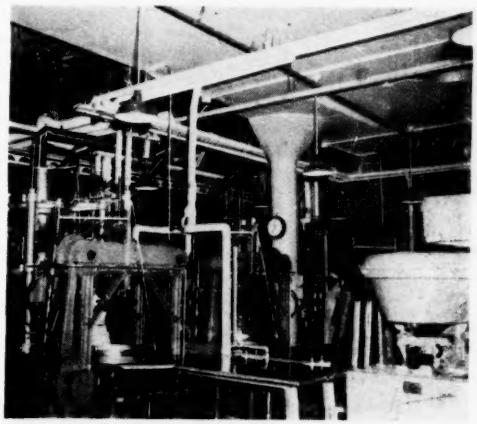
Surfaces contacted by the candies are regularly cleaned and dried at the end of working periods. Floors in working areas show no evidence of drippings or spills. Granted, such accidents can happen at F. & F., but they do not happen as frequently as where employees are not so prompt and meticulous in their sanitation. Systematic cleaning means less cleaning.

Management has aided by purchasing or building new equipment designed for smooth operation and easy cleaning—generally units of stainless steel construction where metal is used.

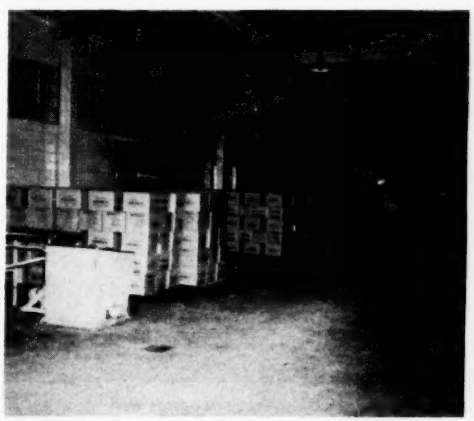
Co-related with the benefits of the F. & F. Laboratories employee relations is the negligible number of lost-time

(*Turn to page* 211)

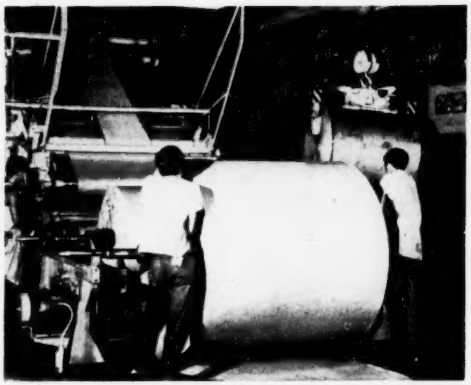
TILE WALLS, stainless steel surfaces, fresh-painted machines, clean uniforms—all stimulate cleanliness.

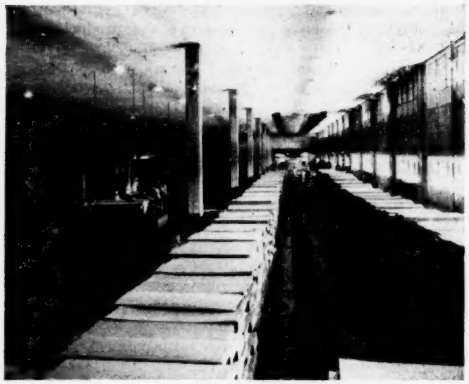


SYSTEMATIC cleaning and painting keep equipment and pipes free of dust, grime, and other accumulations.



SMOOTH-SURFACED FLOORS, roomy and unobstructed passageways, make for a spic-and-span shipping room.

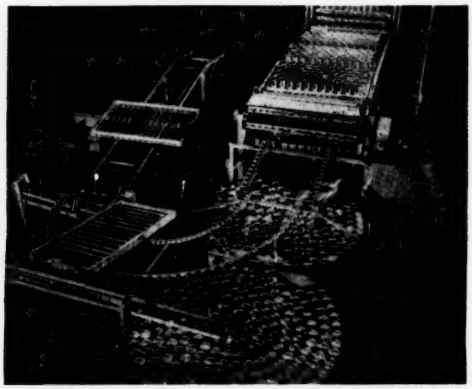




Pineapple company's manufacture of fiberboard boxes . . .

CASES are made in company's own box factory. Here, liner board is combined with corrugating medium.

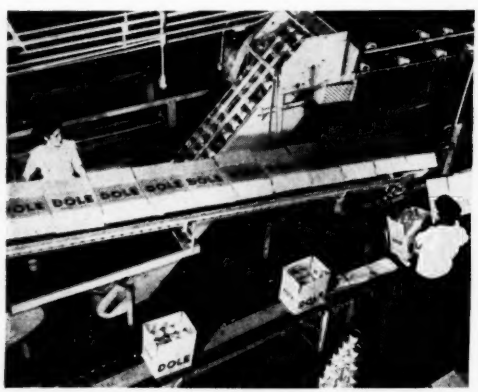
SIX MILLION fiberboard cases are stacked ready to use before the company goes into its peak season.



. . . is carefully timed with flow of cans through labeling lines . . .

AFTER cooling, cans go on automatically stacked wooden trays, then to the labeling lines.

TRAY-UNLOADER dumps cans onto revolving double disks, each feeding a labeling machine.



. . . to packing lines, keeping pace with demand for case goods.

CASING machine automatically divides cans into desired packing pattern. Plunger transfers them into cases.

LIFT-TRUCKS and pallets are used in the movement of cases from casing lines to shipping.

Coordination Is the Key to Overall Plant Economy

All Haw-Pine facilities—from its box factory and byproducts plants to its research and engineering departments—are teamed for high production efficiency

C. R. HAVIGHORST
Associate Editor, "Food Industries"

Third Special Article On Hawaiian Pineapple Co.

To attain maximum working efficiency and economy, Hawaiian Pineapple Co. gives special attention to its auxiliary plants and facilities. And accented in particular is the coordination of these activities with the operations of the giant Honolulu cannery.

The company operates its own box factory. Its byproducts plants produce bran, citric acid, and sugar. There are comprehensive research and engineering facilities. And, rounding out the picture, there is a carefully developed maintenance program, as well as personnel training and employee relations plans.

Fills All Box Requirements

Corrugated boxes are made at the rate of 10,000 per hour in the company's box factory. Located in a large two-story warehouse, it produces the entire shipping-case requirements for the company. Here, 2-ton rolls of paper stock are made into B-flute corrugated fiberboard, cut, scored, slotted, printed and folded.

Most of the cases are of the patented "Quad" type, taped inside and outside on one end, rather than stitched on the corners in the customary manner. From a 3,800-gal. settling tank, a continuous supply of sodium silicate glue, manufactured in this plant, is pumped to the corrugating machine.

Before the company enters its peak summer season, it is customary for the container plant to have in storage about 6,000,000 finished fiberboard cases.

In this box department over 1,000 tests are conducted (by the company's laboratory division) in a normal operating day. In addition to tests carried on during the manufacture of glue, extensive analyses are made of the paper stock and the finished cases. Principal among these are caliper, Mullen (burst), compression, tear, adhesion, moisture, beam, and humidity tests.

The highest degree of coordination is necessary to bring together, at each of the pineapple plant's twelve labeling and casing lines, an adequate supply of boxes, labels, and cans to meet requirements of the run. This coordination is one of the responsibilities of the warehouse control department.

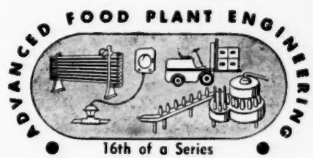
With its own complete, machine-accounting equipment and personnel, this department is able to reconcile unfilled shipping orders with warehouse stocks of finished cases, of unlabeled cans, and current cannery production by pack item. Based on this information, each of the major warehouse departments—case manufacturing, can storage, print shop, cased goods storage, and shipping—is informed of its responsibilities to each labeling and casing line.

The empty Quad cases are unfolded on a mezzanine directly above the lines, then delivered by chute to the case-filling stations. Recently, the company installed a machine that will automatically open the empty cases at a rate of about 1,400 per hour, and all lines are now being equipped with these machines.

Trays of cans, brought from the cooling room on cars, are emptied into the labeling lines by means of hydraulic tray hoists and power-operated tray unloaders. The latter dump the cans on a revolving double-disk feeder, from which they are conveyed by belt and elevator to one of the two labeling machines on each line.

Timed With Labeling, Casing

Labels are sorted, stored, and delivered to the appropriate labeling machine by print shop personnel. Hoppers on each machine hold about 2,000 labels each, minimizing time required in refilling. A table beside each machine holds an additional reservoir of labels, sorted in advance according to the sequence in which they will be run. The machines, themselves, have been modified so that lap paste may be taken directly from original 5-gal. containers.



Having passed through the labeling machines, the cans arrive at the case-filling stations. Here, the company has recently installed automatic case-filling machines, each of which handles the output of a single labeling machine. The cases are carried by gravity roller from the two case fillers on each line to a single sealing machine and compressing unit. Thus, a standard line consists of one can-feeding station, two labelers, two case unfolders, two case fillers, and one case-sealing machine and compression unit.

Cases are taken from roller conveyors at the end of the lines and stacked on pallet skids. Fork-lifts promptly load the pallets on trucks, which carry them either to the company's warehouses or directly to the shipping docks.

A conception of the coordination achieved in these operations may be gained from the fact that 2,000 cases per hour is considered an average output for a single sealing machine handling standard can sizes.

How Byproducts Are Made

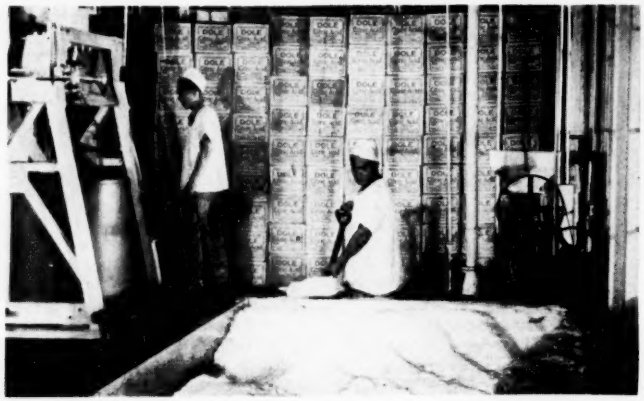
A major phase of the company's operation is the conversion of those portions of the fruit not suitable for canning. These are made into marketable byproducts. Installations for processing these products are located in the Honolulu plant area.

Pineapple bran is made from the shells, ends, and trimmings. These materials are passed through shredders and then through a series of screw-type presses. The solid portions leaving the presses are dehydrated in three rotary driers having a total capacity of about 30 tons per hour. The resulting dried product — pineapple bran — is then bagged and used throughout the islands as a livestock feed.

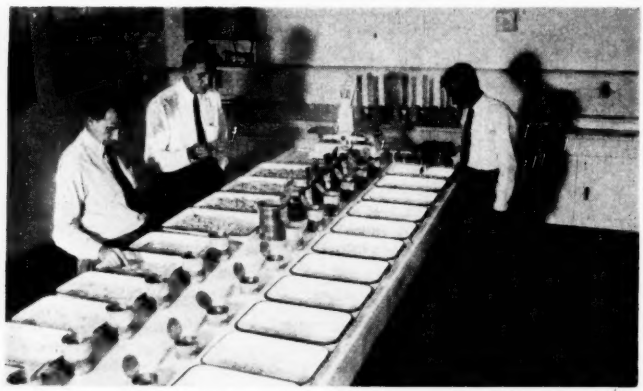
The juice from the presses is treated for the recovery of citric acid. After being heated, screened and filtered, the juice is run into liming tanks, where calcium citrate is precipitated. The calcium citrate is then filtered from the juice and decomposed by the addition of sulphuric acid.

The resulting precipitate of calcium sulphate is separated by filtration from the citric acid solution, which is then carried through a series of refining steps to produce pure citric acid in

Byproducts Made . . . Fruit Tested . . . Employees Trained



COMPANY produces bran, citric acid and sugar as byproducts. Above: Drying finished citric acid crystals, used in drug and beverage industries.



PINEAPPLE quality control is carried on by the Inspection Division. Samples are tested continuously for weight, Brix, fill and many other factors.

EMPLOYEE relations program is company-wide. Here, a group of junior supervisors gets classroom instruction in human relations.

crystal form. Graded by size and boxed, the refined crystals have a ready market in the pharmaceutical and beverage industries.

After the removal of citric acid, the juice is pumped to an ion exchange plant. Here, it is circulated through synthetic resins that remove the minerals and acids it contains, leaving a high-purity sugar. This new process enables Dole to recover about 4,000 tons of sugar annually.*

Research Program is Comprehensive

The company conducts an extensive research program,** and it is at the Honolulu plant that all research activities, both in agriculture and in processing, are coordinated. Increasing centralization has now effected a more efficient use of equipment and technical personnel. In accord with this policy, five new, separate laboratories, complete with auxiliary facilities, were opened in Honolulu during 1947.

These include an organic chemistry laboratory, where investigations pertaining to food processing are conducted, besides complicated chemical analyses, of soils and plants, that cannot be made conveniently at the plantations. Another laboratory is devoted solely to non-chemical research in food technology; still another to bacteriology and plant sanitation.

Separate facilities for research in frozen foods have also been completed, and a photographic laboratory, a library, stockroom, and a complete statistical section have been included in new installations.

The successful application of ion-exchange principles in the pineapple industry has been one of the latest achievements to come from the company's laboratories. In addition to its fundamental research on this problem, the research department operated an ion-exchange pilot-plant in which the feasibility of the project was demonstrated and important operating experience acquired.

The new Dole frozen pineapple is the result of the joint efforts of the research, processing, and product development departments. Much of the company's success with this new product must be attributed to the two years of research devoted to the effects of various freezing and packaging methods on fresh pineapple before the frozen product was put on the market.

Also part of research is the fruit quality department.*** Its program,

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* This process was detailed in May 1948 FOOD INDUSTRIES.

** Basic phases of the agricultural research on the various plantations were described in the first article of this series, Dec. 1948 FOOD INDUSTRIES.

*** Functions of this department were indicated in the second article of this series, Jan. FOOD INDUSTRIES.

probably unique in the canning industry in that it affords a sensitive, day-to-day processing check on the quality of harvesting, has been one of the most important contributions of the research department.

Inspection and Quality Control

The functions of inspection and quality control are not carried on by the research department but by the processing division itself. Through two subordinate divisions—inspection and the control laboratory—the processing staff maintains a close and detailed surveillance over the entire operation of the Honolulu plant. In general, the responsibility of these two subordinate divisions is divided according to the technical requirements of the services they perform.

In inspection, continuous, on-the-spot quality checks of the canning process are performed. Supplementing these checks are the regular examinations of samples taken from each production line.

On the other hand, the control laboratory makes detailed chemical and physical analyses of the ingredients and of the finished products in all phases of the factory operations. It is also responsible for controlling the treatment of factory boiler and waste waters.

Engineering Development Primary

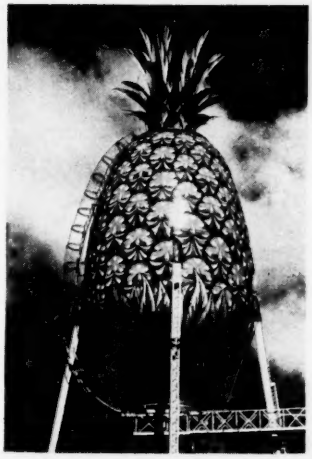
Inevitably, any account of the company's agricultural and processing operations is also a record of the achievements of its engineers. The importance that the company places on engineering development is made evident in its comprehensive organizational set-up.

The manager of the engineering planning division is also a vice-president of the company. Directly responsible to him is the senior planning engineer, who in turn coordinates the work of the four major sections of the division—factory engineering development, structural and machine design, plantation engineering development, and plantation housing development.

A drafting department, under the supervision of a chief designer and chief draftsman, and with a total of 14 other designers and draftsmen, completes the division. This department also operates its own photostating and blueprinting facilities.

Separate from this division, though closely coordinated with it, are the offices of the plant engineer in Honolulu and those of two plantation engineers. A mechanical experimental shop, directly under the plant engineer, has proved itself of great value in the development of new equipment.

The company's suggestion-award program has also been fruitful in encouraging the development of improvements both in the factory and on the plantations.



HONOLULU landmark is 100,000-gal. water tank above cannery. Pineapple shape has proved highly feasible in "taking" hydrostatic pressures.

Responsibility for the supply of all utilities and for the maintenance of factory buildings and equipment is distributed among the mechanical division, the electrical division, the plant service division, and the operating departments themselves.

The mechanical division provides, through the machine, welding, blacksmith, sheetmetal, carpenter, and paint shops, facilities for major installation and maintenance work. All electrical work is under the electrical division. General upkeep of roads, yards and employee facilities, and also the protection of the entire factory area, is under the plant service division. Each operating department, however, is sufficiently equipped and staffed to perform normal maintenance and repairs on its own equipment.

Fleet Trucks Used

While most freight is trucked to and from the docks by common carrier, the fresh pineapple is hauled to the cannery by the company's own transportation division. A fleet of 25 20-ton semi-trailer-and-tractor units, each carrying two 7-ton bins, brings the fruit from the Oahu plantation. Fruit from the company-owned Island of Lanai, however, is hauled from the nearby wharf in single-bin loads on 10-ton trucks.

Employee Relations Company-Wide

Since Dole's employee relations program is company-wide, it follows the same lines in the cannery as on the plantations. A personnel division, responsible to the plant manager, is charged with recruiting and hiring, maintenance of records, explanation and compliance with company policy, training, dissemination of information, administration of benefits, and the company recreation program.

The industrial relations department provides staff assistance to the operating and personnel departments of the factory and plantations. It also aids top management.

To operate the Honolulu cannery, about 7,000 employees are required in the peak summer months and about 2,100 during the off-season. During the summer, the factory, like the plantations, is a traditional source of income for high school and college students. In July and August, it provides approximately 3,000 of these young people with the opportunity to earn all, or a large part of, their school expenses for the coming year.

Job classification and evaluation, supervised by the industrial department, is also company-wide. Similar jobs receive the same pay, whether they are performed on the plantations or in the cannery. Hourly rates for men range from a base of 97¢ to $1.77 per hour. These rates are well above the national average for agricultural and food processing employees.

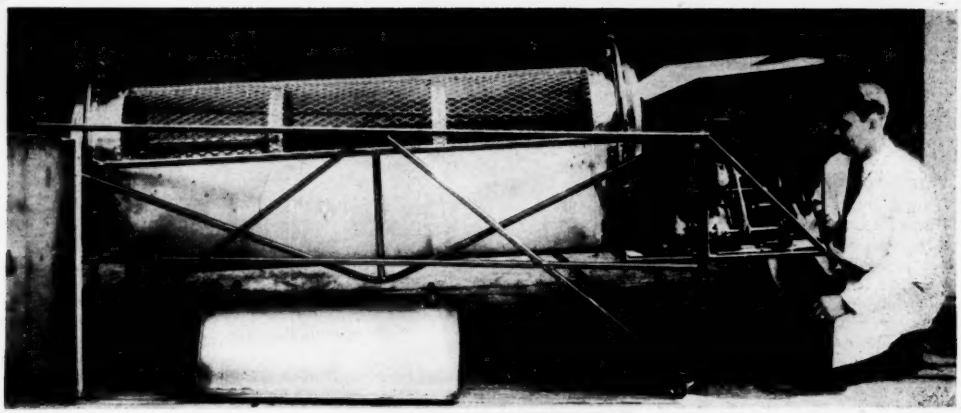
Worker Benefits Cited

In addition to take-home pay, company-sponsored benefits considerably augment the real wages of its employees. Those workers who have passed the first anniversary of their employment receive an annual paid vacation, substantial sick-pay benefits, and opportunity to participate in a low-premium group insurance plan and a retirement program.

Training and the dissemination of information are playing an ever increasing role in the company's employee relations program. A determined effort to assure the broadest opportunity for promotion has given stimulus to the apprentice system that has long existed in the skilled trades group of employees.

The industrial relations, personnel, and operating departments cooperate in holding group discussions on the company's annual report. A supervisory conference program, begun in 1947, has already produced tangible results—a revision of the house rules and the installation of a new merit-rating program. And the program's value in acquainting all levels of management with their common problems is recognized.

With such progressive management, no department of the Hawaiian Pineapple Co. is ever static. New means to meet changing problems are constantly being evolved.



It Recovers Edible Products From Fish Scrap

Quality flesh suitable for making profitable foods are screened from heads, napes, tails, and other ordinarily disposed parts . . . Ground bone residue makes good bonemeal

A. W. LANTZ
Research Engineer,
Pacific Fisheries Experimental Station,
Fisheries Research Board of Canada,
Vancouver, B. C.

With greater quantities and varieties of fish being prepared for the packaged and frozen fish fillet trade, a new machine developed at the Pacific Fisheries Experimental Station, Vancouver, B. C., makes it possible to recover fish material hitherto regarded as waste and utilize it in the making of various profitable products.

In customary fish canning and filleting operations, one-quarter to one-third of the edible flesh becomes trimming waste. This portion, ordinarily lost, can now be utilized for new types of canned, smoked, pickled, and spiced products.

This development is in line with the emphasis on food conservation, which has been evident in the fishing industry as in other food production and manufacturing operations. On the Pacific coast, the attention of the engineering staff of the experimental station has been focused for some time on the flesh remaining attached to the heads, napes, tails and other trimmings. Considerable quantities of such "waste" flesh result from the filleting, canning, steaking and other processes performed on the larger species of commercial fish from both coasts and lake fishery regions of Canada.

Fish reduction processes have long been in use for the conversion of both whole fish and trimmings into fish meals and oils—valuable commodities for which there are important and continuing demands. There is no intention of displacing this meal and oil production. Rather, the new development is based on the fact that a large proportion of present fish waste is still available for reduction. Flesh can be recovered from scrap by the new machine in a quality suitable for the preparation of products such as fish pastes, loaves, cakes, fishettes (a sausage-like product), and similar delicatessen.

Machine Design and Operation

The machine consists primarily of a rotary screen drum made from expanded Monel metal or aluminum. This drum, which is 6 ft. long and has a diameter of 18 in., is set on an inner frame, which, in turn, is bolted to a master outer frame, and can be adjusted to different degrees of slope.

Various types of screens may be used interchangeably as surfaces of the drum. Three kinds of screen-mesh have been found sufficient—hexagonal, triangular, and square. The latter is seen in the photos. These, together with additional circular and octagonal screens, are employed on the Station unit.

The agitation created by the rotating motion of the drum (varying in speed from 10 to 40 rpm.) is the basis of the separation process. When the machine is in operation, precooked flesh separates from the bone and other components, passes through the screen, and is collected in a receptacle fastened to the lower section of the inner frame. The bones gravitate to the lower end and drop through the open end of the drum into a container.

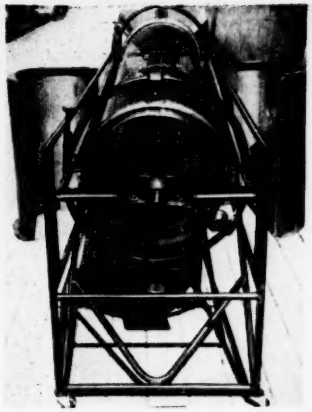
The ½-in mesh triangular screen works effectively for all fish heads when the drum is turning at a speed of 30 to 40 rpm. The hexagonal (or octagonal) screens are used with cod flesh and bones. The square screen is employed for salmon.

Flesh Scrap First Cooked

Before salvaging flesh from scrap with the new apparatus, it is first necessary to cook the fish materials. This may be done by use of an attachment to the apparatus which cooks the scraps under partial steam pressure and feeds them to the revolving unit. The operation is continuous, eliminates handling of the hot materials, and has the added advantage of feeding the material into the revolving drum while hot. Separation is more rapid and complete if the high temperature of the product is maintained during the operation.

If this special cooking attachment is not used, the trimmings may be steamed under atmospheric pressures at 212 deg. F. in precookers, cannery retorts, or other suitable equipment employed in fish processing plants. A revolving-screw tubular cooker with steam inserts is ideal for fish heads, napes and belly trimmings, while an endless-chain exhaust box is practical for backbone.

Liquids lost in steaming are recoverable, as in usual precooking and re-



duction processes. In experimental work, steaming times were varied from 2 min. for salmon backbones to 4 min. for cod trimmings and 7 min. for most types of fish heads. Heads of red snappers were an exception. These were removed and subjected to 15-20 min. cooking periods so as to soften the fibrous tissue. All work to date has been with species of fish found along the Pacific coast.

Salmon Problem

Actually, salmon present the greatest problem because the flesh adheres more tenaciously to the backbone than is the case with other fish. If the flesh is hot during the entire operation and the ½-in. mesh screen is used, the separation is complete. If, on the other hand, the product is cold during the operation, a spinner is inserted in the drum to facilitate separation.

This spinner has three blades and turns in the center of the drum at speeds varying from 100 to 800 rpm. It tosses the scraps against the sides of the screen so that the resultant jar aids in loosening the flesh from the bones. It is preferable, in this type of work, to operate spinner at 250 rpm. The spinner may be used with any of the screens. It may be noted here that metal covers fit over the drum to avoid splattering, which is particularly to be expected when the spinner is employed.

Continuing on the salmon separation: The triangular screen proved unsatisfactory for vertebral separation because the bones tended to cling in the angles of the screen. Regarding salmon heads, these are specially prepared for the separation process. The snout portion is removed by cutting immediately back of the eyes—because the heavy black substance on the top of the snout gave a murky, objectionable appearance to the recovered flesh.

In the course of the Station's work, shape of the drum proved to be a factor in the efficiency of the work. Accordingly, there has been experimentation on cross-sectional shape of the drum to extend the usefulness of the apparatus for more effective handling of all tested types of Pacific fish.

Data on Flesh Recoveries

Table I presents results of experimental separation of flesh bone trimmings from species of fish found in Pacific waters. Section A of this table covers (1) the percentages of fillets prepared, and (2) the resulting types of wastes in relation to dressed fish.

Section B gives (1) the shrinkages resulting from the steaming of wastes from the backbone trimmings of filleting operations, and (2) the recoveries of flesh and final waste after going through the separator.

Section C gives data analogous to Section B, but for treatment of heads.

Section D treats the recoveries from heads and backbones of grey cod, lemon sole and starry flounders. A separate section is shown for these species because the backbones and heads are commonly left intact after filleting operations. Though this was also true for red snappers, it was considered necessary to separate the heads and subject them to a longer cooking period to soften the long, clinging, fibrous tissue peculiar to this type.

Possible Uses of Recovered Flesh

Flesh recovered from backbone trimmings has been canned and processed. Various types of fish loaves have been made from the canned coho and other salmon flesh. Fish cakes were made from lingcod and grey cod. These delicatessen compared most favorably with those made from fresh flaked or ground fish.

The flesh from the headbones was strong and had a heavy fish odor. This flesh may prove valuable as high-protein feed for animals, but it is doubtful if it could be used for human consumption. This product was, however, canned before the practice of removing the snout, and this may make an appreciable quality difference.

The bones and remaining waste, when dried at 140 deg. F. and ground, produced a bonemeal of good quality.

Some fish processing plants on the Pacific coast are using equipment with a beater-centrifugal principle to separate fish flesh from bone and other waste material. This equipment, however, is generally used for raw materials and delivers the flesh in a disintegrated, paste-like form.

The machine developed at the PFE station is most noteworthy in that it delivers flakes and pieces of cooked flesh in such a form that certain products can be prepared therefrom which could not be prepared from the raw disintegrated material. A similar machine is now being built for demonstration purposes at the Atlantic Experimental Station of the Fisheries Research Board. The eastern station will conduct experiments on separation of flesh bone trimmings from species of fish found in the Atlantic.

Details of construction of the machine are the property of the Fisheries Research Board of Canada. Requests for information may be sent to the Fisheries Experimental Station, Vancouver, B. C.

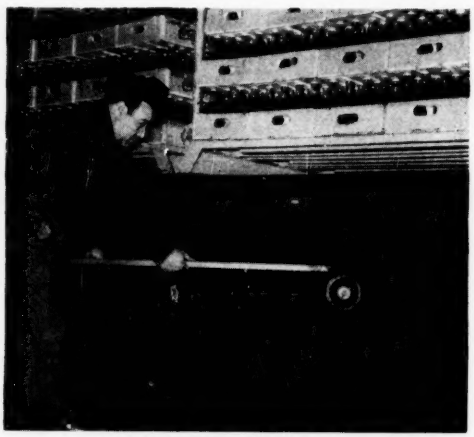
TABLE I—Recoveries Of Fish Flesh From Scrap Materials, Using Salvaging Machine

	Grouping of materials and later recoveries expressed on basis of starting materials = 100	Coho Salmon	Pink Salmon	Chum Salmon	Jack Spring Salmon	Red Spring Salmon	Sockeye Salmon	Lingcod	Red Snapper	Grey Cod	Flounders (Starry)	Soles (Lemon)	Halibut
A	Fish (dressed)	100	100	100	100	100	...	100	100	100	100	100	...
	Fillets	58	57	55	55	59	...	51	32	29	32	31	...
	Skins of the fillets	10	7	9	10	9	...	8	28	7	15	11	...
	Backbones, napes and trimmings	18	22	20	19	20	...	41	52	*	†	‡	...
	Heads	14	14	16	16	12	...	...	8	*	†	‡	...
B	Backbones, napes and trimmings	100	100	100	100	100	...	100	100	100	100	100	...
	Backbones, napes and trimmings (steamed)	90	90	94	89	89	...	87	89	*	†	‡	...
	Flesh and some rib bones	59	64	66	25	67	...	63	68	*	†	‡	...
	Bones and some skin	31	26	28	64	22	...	24	21	*	†	‡	...
C	Heads	100	100	100	100	100	100	...	100	100	...	...	100
	Heads (steamed)	96	97	97	95	96	92	...	75	*	†	‡	88
	Flesh	51	45	40	20	28	38	...	48	*	†	‡	24
	Bones, skins and gills	45	52	57	75	68	54	...	27	*	†	‡	64

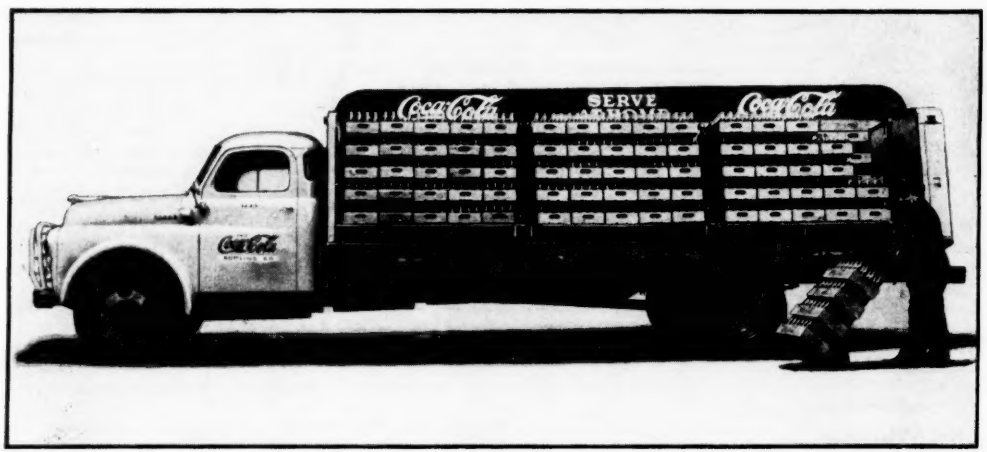
		*Grey cod	†Starry flounders	‡Lemon soles
D	Backbones and heads	100	100	100
	Backbones and heads (steamed)	83	80	78
	Flesh and some skins	57	28	20
	Bones and skins	26	52	58

Loading is simpler and faster with palletized trucks

Unloading is made easier.



And use of dolly carried along . . .



. . . enables driver to deliver four cases at one time.

Trucks Loaded 50 Cases At a Time

With pallet truck bodies served by fork lifts, bottlers save man-hours and cut distribution costs. Loads of 200 and 300 cases carried safely

THE bottlers' palletized retail delivery truck, which first came into use early in 1948, presages solution of one of the bottlers' most baffling problems—how to eliminate the high cost of manual loading and unloading.

Of course, the loading of the palletized truck is not entirely mechanized. Some men are still required. But the change from loading one case at a time to 50 cases at once on a pallet by means of a fork-lift truck has reduced the total time of loading and unloading a 300-case truck in one installation from 100 min. to 18 min. The palletized truck thus saves 82 percent of the former manual loading time.

With most fleet owners enthusiastically happy if they can reduce their truck loading and unloading time by 15, 10, or even 5 percent, some idea may be had of this really revolutionary development.

It must be remembered that this 82-percent saving applies to time—not to loading-and-unloading dollars. For there are other factors:

Against the saving in time and labor dollars, there are new and additional expenses on the other side of the ledger. While the new pitched floor truck body is less expensive than the shelf-type bodies formerly employed, the initial cost and maintenance of the wooden pallets and the industrial fork-lift trucks are additional expenses.

The present labor cost plus a prorated expense for the pallets and fork-lift trucks, compared with the previous manual labor, will indicate the net dollar savings. And there is every indication that the net actual savings of the palletized truck system will be both considerable and permanent.

Three Distributors Benefited

These savings have already been considerable with three leading distributors: The Coca-Cola Co. of Illinois had between 85 and 100 palletized delivery trucks and semi-trailer transport units, of 200 and 300 case capacity, in operation last summer. They are now in continued use with apparent satisfaction, although the operating company does not wish to talk about them for publication at this time.

The Pepsi-Cola Co., at Long Island City, N. Y., has also made great strides (June 1948 FOOD INDUSTRIES).

On about May 1, 1948, the Coca-Cola Bottling Co. of New York, Inc., began the operation of 194 palletized trucks (somewhat similar to the Chicago Coca-Cola trucks) from five New York City branches. We are indebted to the New York City Coca-Cola company for the operating data on its palletized trucks.

The aim of all three of these companies was the same, namely to find some means to load and unload its soft-drink trucks quicker and cheaper than by loading and unloading each case by hand.

Seek Efficiency

Since bottlers generally and certainly Pepsi-Cola and Coca-Cola have one standardized product and size of bottle, they have not been subject to the necessity of spotting individual orders in the load, consequently, they have been seeking for years to find some means to eliminate the slow and costly method of manually loading and unloading one case at a time.

Until the advent of the new palletized body, the typical bottler's truck body consisted of several horizontal shelves, open on both sides, with the cases loaded or unloaded from any shelf at will on either side of the truck chassis. They were satisfactory from the route-operating viewpoint, but they still had the fundamental drawback that each case had to be loaded and unloaded individually.

If the load is made up of cases of one standard-size bottle and the problem is to load more than one case at a time, why not solve it by loading and unloading all the cases at once by removing the entire body from the chassis? This can be done—by the use of demountable bodies—and it is a definite solution of the problem.

Perhaps the most outstanding instance of the successful use of demountable bodies by a soft drink manufacturer is that of Vernor's ginger ale in Detroit. The story of this operation has been told (Oct. 1948 FOOD INDUSTRIES).

Now, it is quite possible the Chicago and New York City Coca-Cola companies might have solved their mass- or volume-loading and unloading problems by means of demountable bodies. But they did not. They chose the palletized system of handling instead.

Starting with two separate one-story buildings—one a bottling plant with the bottling machine visible to the main street through a plate glass window, the other an adjacent garage in which the trucks are stored and serviced—the New York company's first problem was to reduce the manual cost of handling and storing cases inside the bottling building.

The typical Coca-Cola bottling building is rectangular in shape, with the bottling machine in the front center end, flanked by two truck doors, one on each side. Each door opens onto a driveway at least 20 ft. wide, which extends the entire length of the building to the rear end. If the latter opens onto a storage lot forming a part of the ground plot, two doors like those in the front are provided in the rear end in line with each lengthwise driveway.

Immediately behind the bottling machine on the front end are located the bottle-washing and case-filling machines. This leaves the balance of the floor area between the two lengthwise driveways for the storage of empty and full cases and the unloading and loading operations.

Looking at the front end of the building, the old operating procedure, for an old shelf-type body truck returning from its route at the end of the day, was for it to enter the left front door and proceed down the driveway to about the mid-length of the building to a check-in stand. There the empty cases would be unloaded one by one onto wheeled platform trucks, which would later be pulled by hand into the space between the two lengthwise driveways and eventually to the starting point of the bottle-washing operation.

Load at Night

After checking in the load and making out his delivery order for the next day's route, the driver would leave his truck at the check-in stand and proceed to the cashier's cage to turn in his cash receipts. Next, a driver member of the unloading crew would run the truck out through the left rear end door onto the parking lot, where it and the following trucks would be lined up preparatory to again being

driven back into the building for the loading operation.

A member of the loading crew reporting in the late afternoon would then drive the first truck in line through the right rear-end door onto the right driveway, with the truck heading in the opposite direction from that in which it first entered the building. Following trucks would be driven into the building in the same manner to form a loading line.

Tedious Hand Work

Next, members of the loading crew would pull the wheeled trucks carrying the full cases from the storage space between the two driveways to positions along both sides of the trucks and load the cases on the truck body shelves, one case at a time. With the truck fully loaded, it would then be driven out through the front right door of the building and into the garage, from where the driver, reporting the following morning, would simply start on his route.

One glance, from a competent industrial warehouse engineer, at the above handling operation was sufficient to indicate that here was a fertile field for great labor savings by palletizing both the empty and full cases. The value of industrial fork-lift trucks to store and double-tier the pallets along aisles, together with substitution of mechanical for manual horizontal movement anywhere over the floor, was also apparent.

With pallets and fork-lifts decided upon to effect economies in the purely warehousing functions of the operation, the necessary unloading and loading cycle could be completed if some way could be devised to utilize the same pallets and fork-lift trucks to load and unload the route delivery trucks.

It was evident that the old shelf-type truck body would not do. Hence an entirely new type of body had to be developed to carry loads on pallets so that the loads would not fall off while the truck was in motion on its route. And so the palletized truck body came into being with a design so radical that its use gives promise of revolutionizing the entire distribution methods of the soft drink industry.

Pitched Floor

The one radical feature of design of the palletized truck body, which differentiates it from all others, is its pitched, or V-shaped, platform floor, with the outer edges of the floor on both sides about 4 in. higher than the bottom of the V, which extends from the front to the rear end of the platform along its longitudinal centerline. Along this centerline, a vertical steel plate from 5 to 6 ft. high extends from the front to the rear end, thus dividing the body into two equal lengthwise halves. Crosswise metal plates of the same 5 to 6 ft. height on both the front and rear ends complete the functional design.

POSTERS are carried in weather-tight compartment at rear of truck.

The pallets, with their loads on top, are placed flat on the pitched or inclined floors on either side of the longitudinal centerline plate, and the tops of the inside cases bear against the vertical centerline plate. This pressure keeps the cases from sliding off sideways while the truck is running straight ahead.

Each pallet carries 50 cases, and the chassis and body are dimensioned to carry either four pallets, two on each side, to give a total load of 200 cases—or six pallets, three on each side, to give a total load of 300 cases.

Bodies Differ

To keep the cases from sliding off frontways or backways, as when the truck makes a sudden stop or goes around a corner, the Chicago-type body utilizes the front and rear-end transverse vertical plates and one additional transverse plate to form four pockets on the four-pallet body, and two such plates to form six such pockets, three on either side, on the six-pallet or 300-case body.

The above intermediate plates are not used on the New York City type of body. Instead, pipe rail guards extending upward to the top rows of cases are provided permanently on each end of the pallet.

In the New York City type, the bodies are entirely free and open at the top. The Chicago bodies have flat, metal canopy tops to afford some protection to the load against the sun, rain or snow.

In the palletized truck operation, the course of the truck in and out of the building is exactly the same as before. In loading, the fork truck approaches the truck from either side at right angles to it inserts the pallet and load over the body in a horizontal position, and then tilts its forks to set down the pallet flat on the pitched floor. This eliminates bottle breakage and shifting of cases between rows. The unloading is done in the reverse manner.

Weights Cited

Each case of 24 full Coca-Cola bottles weighs 38 to 40 lb., including the case. The pallets are 65 in. long and 36 in. wide. The cases are loaded onto the pallets by hand, five cases long and five cases high, with two cases wide to give the standard 50-case pallet load.

At 40 lb. to the case, the pallet weight is 2,000 lb. The payload of the four-pallet, 200-case load is thus 8,000 lb. and the six-pallet, 300-case load, 12,000 lb.

The fork-lift trucks originally selected were of the electric storage-battery type because they were to be employed in an inside operation where the exhaust gases of a gasoline-driven truck might be objectionable. However, the New York City company now has six electric and nine gasoline fork-lift trucks in operation.

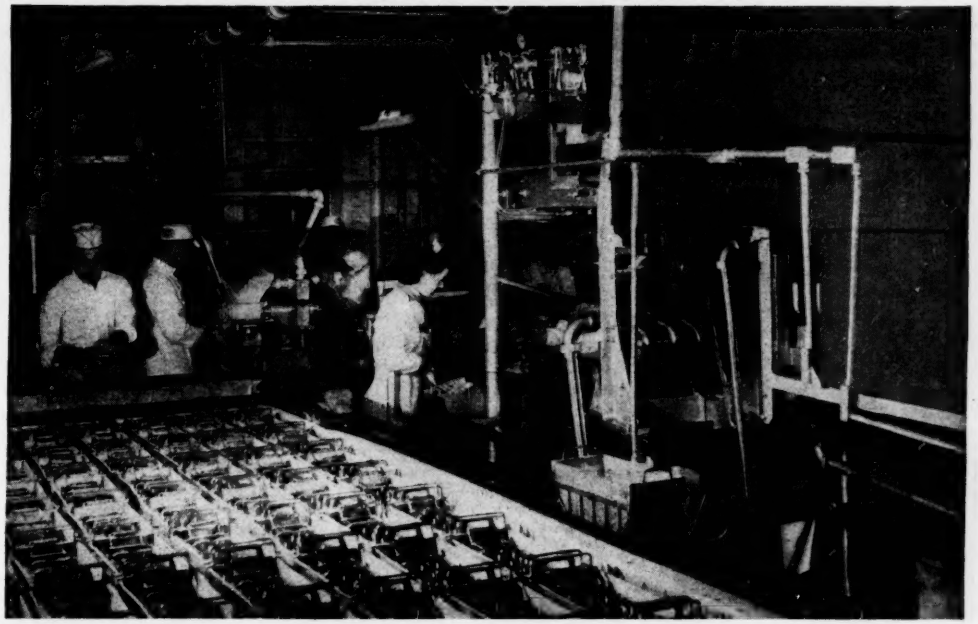
Use Both Types

To date, the adequate truck-ceiling height of the bottling building and the frequent opening and closing of the truck doors has supplied sufficient ventilation to dissipate the gas truck exhaust without ill effects to the workers. The company states that both types are doing a good job, and that only an accurate cost record kept over a period of several years will determine which type is most economical.

In the Chicago operation, most of the trucks are 200-case units. It is reported that two Towmotor gasoline fork trucks working in unison, one on either side of the truck, can load it at the rate of 10 to 12 trucks per hour or one truck every 5 to 6 min.

Some idea of the gross savings may be had from the time-saved figures of the New York company. With a unit saving of 82 min. per truck on the 300-case model, the total minutes saved for a day's operation of 187 trucks would be 82 times 187, or 15,334, which is equivalent to a total of 255 man-hours.

If only two-thirds of this time can be recovered, it will amount to 170 man-hours per day. At a labor rate of $1.25 per hour, this would amount to $212.50 per day—and you can buy a lot of pallets and fork-lift trucks with that kind of money.



NEW SYSTEM at General Ice Cream Corp.'s New Haven, Conn. plant produces 1,000 to 1,200 stick novelties hourly.

Ice Cream-Stick Output Tripled—Labor, Coating Saved

This striking performance has been achieved with a new continuous production system featuring automatic dipping and bagging

A. V. GEMMILL
Assistant Editor, "Food Industries"

Three times as many stick novelties are being produced—at less than a 50 percent increase in labor—with the continuous "pop"-making system newly installed at General Ice Cream Corp.'s New Haven, Conn., plant.

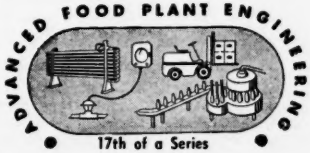
Nor is the labor saving the sole gain. In addition, there has been an increase of approximately 40 percent in the number of chocolate covered 'pops' dipped per pound of coating.

General's accomplishment is notable because stick novelties represent a sizable percentage of the production of many ice cream plants. And the labor requirements of the operation have been high, even though units such as semi-automatic mold fillers and stick machines, as well as automatic baggers, have been used in many plants.

With the primary object of reducing this labor to a minimum, the engineering department of the company has worked with a number of equipment manufacturers over a period of years. The system now in operation at New Haven (see Fig. 1) is the culmination of this work. It is a combination of units made by several manufacturers, integrated to give an unusually economical, high-speed operation. Proof of the success of this operation was quickly indicated by the results—70 doz. novelties per man-hour, as compared with the previous production of 26 to 35 doz.

In addition to the saving in labor, an almost unbelievable saving in chocolate has been effected in the new system—35 to 36 4-oz. pops being coated with 1 lb. of material, compared with an average of 24 to 25 by hand dipping.

The system is practically self-contained. It depends upon the plant proper for the ice cream mix and for the refrigeration needed for operation of the continuous freezer, the freezing tank and chill tunnel. Finished products are stored in the regular ice cream hardening room until delivered.



Units comprising the system are: A continuous ice cream freezer of 300 gal.-per-hr. capacity; a 96-mold freezing tank equipped with an electric mold pusher; semi-automatic mold filler; semi-automatic stick machine; and an automatic dipping and bagging unit.

Automatic Dipping, Bagging

Heart of the system is the continuous flow dipping and bagging machine (Fig. 2). It is comprised of: (1) A chill tunnel; (2) an automatic dipping unit, and (3) an automatic bagger. Also included are: A chain carrier which moves products through the chill tunnel and dipping unit to the bagger; a belt packing conveyor; an empty stickholder conveyor; and an air compressor equipped with a 1-hp. motor.

Purpose of the chill tunnel, which is refrigerated by three direct expan-

sion cold plates, is to harden the outer edges of the pops that may have been softened in the defroster. This keeps melted ice cream out of the coating tank and greatly increases the coverage.

The automatic dipping unit consists of a stainless steel tank moving in synchronization with the product carrier. The tank rises and falls when the carrier hangers, provided for stickholders containing ice cream to be coated, are centered above the tank. This dip tank is kept filled with melted coating from a supply tank located directly under it. Excess chocolate, that drips from the coated pops and overflows from the dip tank, returns to this supply tank. Temperature of coating is maintained at 115 to 118 deg. F.

The automatic bagging unit is comprised of a bagger basket and bagger. The basket has 24 compartments arranged in four rows similar to those of the stickholder. Pops fall from it into the automatic bagger in units of 6. Positive opening of the bags in the bagger is obtained by an air blast.

The main frame unit is operated by air through four 4-way solenoid valves. Control is by relays and limit switches at ends of piston rod strokes. Air pressure of 75 psi. is used on the chain index, chocolate dip, and product release. Pressure of 15 psi. is used to operate the bagger basket. This prevents crushing of the product in event of a product jam.

As an example of how the system works, let us follow the operations involved in the manufacture of "Choco-Pops"—bars of ice cream frozen on a stick, then coated with chocolate. (Other stick novelties are made on the same unit.)

Vanilla-flavored ice cream mix, pumped from storage tanks in the ice cream department, is "frozen" in the continuous freezer and fed directly into the hopper of the semi-automatic mold filler. This filler was designed specifically to fill measured amounts of ice cream into the molds, which were likewise especially designed for the manufacture of stick novelties.

The operator holds a mold under the spouts of the filler and, in three movements fills the 24 cavities with ice cream. Another operator receives the filled mold, inserts a stick-holding-and-centering device, which has been loaded with the required 24 sticks by a third operator, and places the mold on a track in the freezing tank.

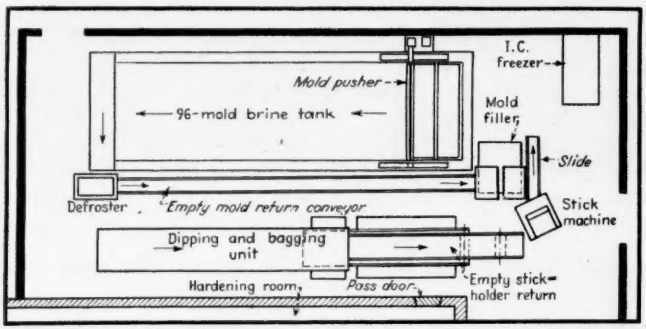


FIG. 1. Studied arrangement of equipment gives maximum production per man hour. Automatic dipping saves coating, speeds operations.

Frozen in Brine Tank

This freezing tank, with a capacity of 96 molds (8 rows of 12 molds each), contains $CaCl_2$ brine which is maintained at -20 to -30 deg. F. by means of ammonia expanded in coils located near the tank bottom. The tank is also equipped with two motor-driven agitators, which keep the brine in continuous high-speed motion.

Near the top of the tank are eight parallel tracks on which the filled molds, submerged to slightly more than one-half their height, move through the brine. Molds are moved forward by means of the electric pusher bar

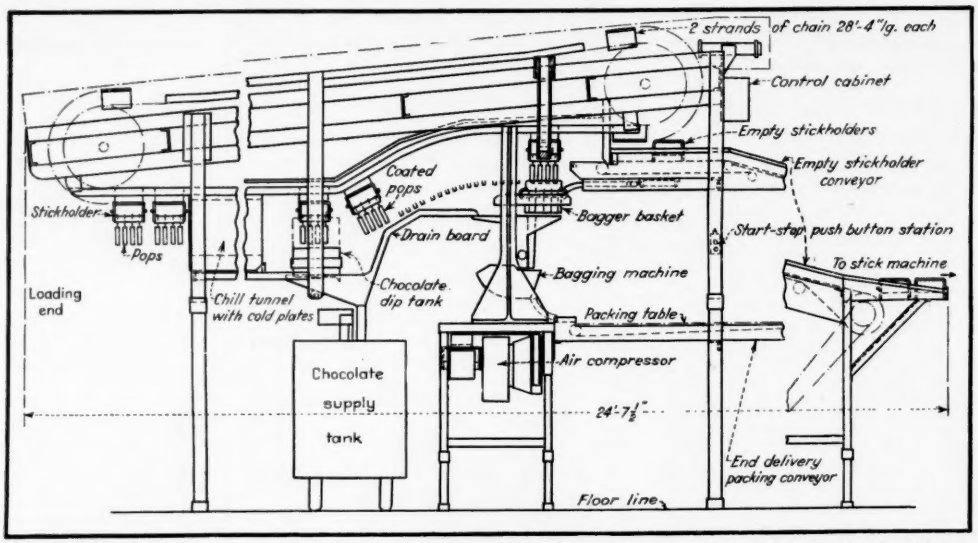
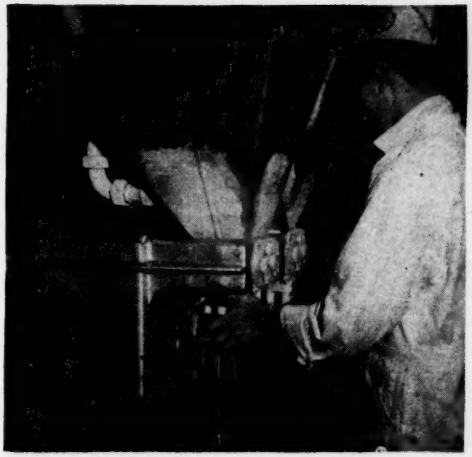
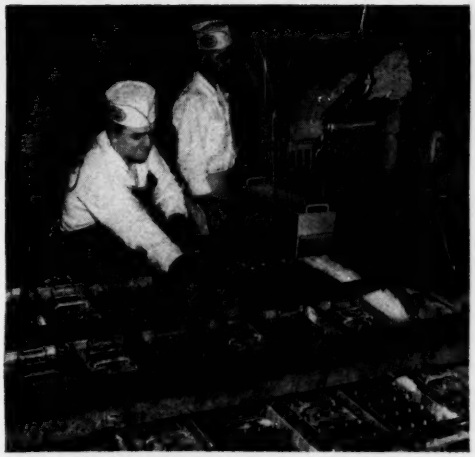


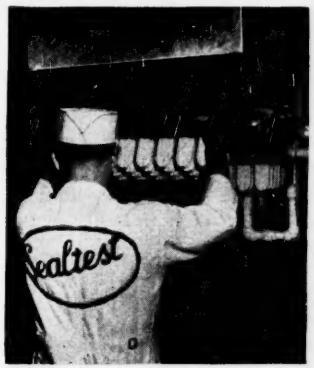
FIG. 2. Automatic dipping and bagging unit is operated entirely by air. Stick holder with 24 pops is first hung on conveyor (far left). Pops then pass through chill tunnel to dipping tank, where they are automatically coated. When dry, the pops are dropped into bagging basket, are automatically bagged, and fall onto conveyor belt of packing table. Empty stick holder is pushed off hooks of conveyor and returns to stick machine to be refilled.



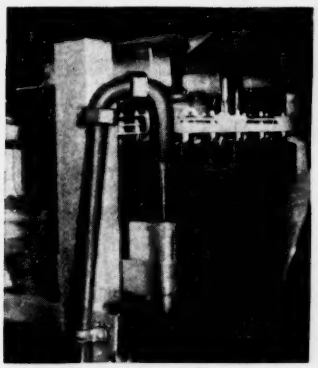
1 MOLD FILLING. Filler delivers measured amounts of ice cream into mold's cavities as operator trips pedal.



2 FREEZING. Filled molds are placed in freezing tank, then sticks are inserted.



3 CHILLING. Pops are removed from mold in defroster, then are conveyed into chill tunnel.



4 DIPPING. After leaving chill tunnel, pops are automatically coated with melted chocolate.

5 BAGGING. Coated pops are automatically bagged, drop onto conveyor and are packed into cartons.

which is operated when a full row of 8 molds is placed in the tank. During the 10-12 min. the molds are in the tank, the ice cream is frozen to the sticks.

When the row of molds reaches the discharge end of the freezing tank, an operator removes them, one at a time, and places the mold in the defroster for a period of time sufficient to loosen the ice cream from the mold without softening it.

He then removes the stick holder, with its 24 pops, from the mold and hangs it on the conveyor which carries the pops into the chill tunnel. Empty molds are washed and conveyed to the mold-filler operator to be refilled.

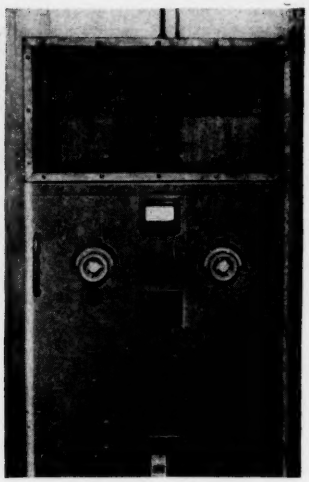
Upon leaving the chill tunnel, the bars, still suspended from the stick holder, are dipped into a tank of melted chocolate coating. Sufficient time is allowed between dipping and bagging to permit the excess chocolate to drip from the pops. Level of coating in the dipping tank is maintained by a pump that delivers a continuous stream of melted coating from the chocolate supply tank to the dipping tank.

When the pops reach the bagging unit they are automatically released from the stick holder and drop into the bagger basket. This basket has 24 compartments arranged in four rows similar to those of the stick holder. As the pops fall from the holder into the basket, those in the rear row drop through openings in the bottom of the basket and are automatically bagged and conveyed to packing operators.

They are packed in cardboard cartons, 24 to the carton. Then the cartons are sealed, labeled and passed into the refrigerated storage room. The bagger basket moves forward, stopping momentarily in each of three additional positions to allow the other rows of pops to enter the bagger, then returns to its original position until again filled. Air pressure for operating the bagger-basket cylinder is reduced from the 75 lb. used elsewhere in the machine to between 15 and 20 lb. This is to prevent crushing in case of a product jam.

After the pops are dropped from the stick holder, the holder is pushed off the hooks on the conveyor by means of a deflector bar. Holders are then conveyed to the stick machine, which is located near the mold filler. An operator, in a single motion, loads the holder with 24 sticks. He then locks the sticks in position and places the filled holder on a slide along which it moves to the operator who places the filled molds in the freezing tank.

When this operator places the filled stick holder in the mold, the cycle has been completed.



TECHNICS USED: **QUICK FREEZING** was achieved in this small unit using alcohol as the freezing medium. **RAPID THAWING** was accomplished in this electronic oven.

Develop New Test for Gaging Leakage From Frozen Fruits and Berries

Method employed at Georgia Tech minimizes previously uncontrolled variables. Samples are thawed in 68-deg.-F. room under mineral spirits

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First result of the frozen food research project at Georgia Tech is the development of a reproducible objective test for the determination of the amount of leakage exuded from a frozen fruit or berry upon thawing.

This is of particular significance since research and development in the frozen food industry have been retarded by the dearth of reproducible tests. The need for such tests was pointed out in a recent FOOD INDUSTRIES article* which described the initiation of the project.

Thawing of frozen fruits or berries is accompanied by the exudation of free fluid, known as drip, leak, or, more commonly, leakage.[1,2] And authorities generally agree that the factors affecting the amount of this leakage are:

(1) original condition of the tissue[3], (2) handling and storage condition prior to freezing[4], (3) the method and rate of freezing[5], (4) storage conditions after freezing[6], (5) the rate and conditions of thawing[7], and (6) the method used to determine the leakage.

The causes are variously attributed to the formation of large ice crystals[8], cell rupture[9], osmotic changes[10], and irreversible changes in the colloid systems brought about by freezing.[7,11,12,13,14]

In the research at Georgia Tech, one of the prime objects has been the study of the specific effect of the above-listed first five factors on the quality of the frozen foods, as measured by the amount of leakage.

In order to study these factors quantitatively, however, it has first been found necessary to develop a method for the determination of leakage** which would be capable of yielding reproducible results.

Those methods which have been described in the literature[9,15,16] are all similar in principle, but variations in the technics employed result in differences among the values reported. It was therefore decided to investigate the effects of the variables involved—in order to evolve a method by which workers in the field could properly evaluate and coordinate their results, so that a study of the various other factors which affect the amount of leakage could then be carried out with scientific accuracy.

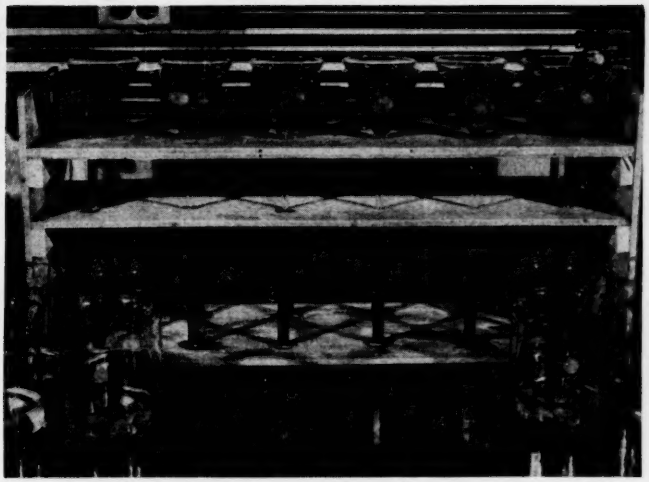
In the work reported in this paper, all factors, other than the method used to determine the leakage, have been held constant, except where some comparison was made, so that the method *per se* could be studied. In order to effect this, fresh, carefully selected fruits and berries were used. These were frozen by immersion to exactly 0 deg. F. and stored at 0 ± .5 deg. in waxed paper cartons with cellophane inner liners. Whenever the rate of thawing of the frozen food was considered, it was compared to the rate of thawing in a room maintained at 68 ± 1 deg. F.

As a result of this procedure, the method proposed is one which minimizes previously uncontrolled vari-

* "Frozen Food Research Program Is Launched at Georgia Tech," June 1948 FOOD INDUSTRIES.

** The term "leakage," as used in the proposed method, means amount of fluid which freely exudes from the frozen food during storage and thawing, including amount which freely exudes from food during period required for temperature of sample to reach 68 deg. F., plus 1 hr., provided the frozen food has been placed in a room maintained at 68 deg. F. in such manner that there is a negligible amount of crushing applied to it.

FRUIT was frozen in baskets, stored in film bags, thawed in beakers.



TWO THAWING METHODS were investigated: (1) Fruits and berries were placed in funnels, and (2) they were immersed in mineral spirits at 68 deg. F.

ables. By its application, it is now possible to study the effect of other factors—original condition, pre-freezing handling, method and rate of freezing, storage conditions and thawing rate—on the amount of leakage obtained. In addition, through use of this method, the experimental results of various workers should be more nearly comparable than has heretofore been possible.

It might be noted, incidentally, that this new method is intended as a tool for research. It is not intended for use in the testing of the leakage from random samples of commercially frozen foods—for truly meaningful results can only be obtained when the original weights of the specimens are known.

Experimental Work

The method originally used by the authors was that proposed by Woodroof[1]. A 50g. sample of the frozen food was weighed and placed in a 60-deg. glass funnel in a room maintained at 68 ± 1 deg. F. The fluid exuded over a 4-hr. period was collected in a graduated cylinder, and the results were reported as the leakage in ml. per 50g. sample. An analysis of the data, obtained from numerous tests on frozen strawberries and frozen peach slices, showed that the standard deviation was ± 30 percent of the mean. With such wide variations, only qualitative conclusions could be made.

Since it was considered that leakage is a highly important determination, a study was made of the uncontrolled variables in this test to determine if a standard, improved technic could be developed to yield more consistent data.

Thawed at 68 deg. F.

There is no theoretical basis for the selection of any particular temperature of surroundings, although the effect of the surroundings will largely determine the rate of thawing, with a concomitant effect on the leakage value. It was felt, therefore, that a standard temperature ought to be employed, preferably one that would simulate the ordinary conditions of thawing of frozen foods. Since 68 deg. F. had been used heretofore, and since photographic dark rooms are usually maintained at this temperature (as is the one used for color photography in this project), it is proposed to adopt 68 ± 1 deg. F. as the standard room temperature. The highly significant effect of the temperature of the surroundings on the leakage values obtained is shown in Table I.

In order to determine the time-leakage relationship, strawberries, carefully selected for uniformity of size and shape, were immersion-frozen under identical conditions, and placed in storage at 0 ± 0.5 deg. F. until tested. Into 60-deg. glass funnels were placed 50g. samples in a room at 68 ± 1 deg. F., and the leakage was determined over a 6-hr. period. A small thermocouple was placed in the center of a berry in the middle of a similar sample in a funnel, and time-temperature data were then recorded.

From the data presented in Table II, it may be seen that the center of the middle berry reached room temperature in 3 hr. and that best agreement among leakage values was obtained 1 hr. after the berries had reached 68 deg. F.

This procedure was repeated using peach slices, and similar results were obtained. On the basis of these findings, it would appear that sufficiently reproducible results will be obtained if the final leakage reading is made 1 hr. after the thawing fruit or berry has reached room temperature (68 deg. F.).

Fluid Adhering to Food

When leakage is determined by thawing the foods in a funnel, the amount of liquid adhering to the funnel should be constant for a given funnel and for a given volume of

"To Remedy the Situation"

Uncontrolled variables in previous leakage-test procedures have been found significant, and may account for many of the discrepancies in data reported in the literature. To remedy this situation, the authors propose a new test procedure and method of reporting the results of determinations on frozen fruits and berries.

In this method, a sample of food is weighed prior to, or immediately following freezing, and sealed in individual containers. Leakage is then determined as the total weight lost during storage and thawing. Thawing is carried out under mineral spirits in a room maintained at 68 ± 1 deg. F. The period selected for thawing is the time required for the temperature of the sample to reach 68 deg. F., plus 1 hr. for reproducible leakage results.

Temperature and Time are Significant in Leakage

TABLE I—TEMPERATURE OF SURROUNDINGS Effects Leakage* of Strawberries

Temperature Deg. F.	Number of Determinations	Mean Leakage (g. per 50g. sample)	Standard Deviation of Mean
68	18	12.6	±1.8
73	16	16.1	±2.6
93	15	19.2	±2.2

*Determined by method proposed in this paper, except that temperature of surroundings was varied.

TABLE II—TIME EFFECTS LEAKAGE* of Strawberries

Time (hours)	Temperature at Center of Strawberry Deg. F.	Total Leakage (ml. per 50g.) Sample No. 1	2	3	4
0.0	0	0.0	0.0	0.0	0.0
0.5	24	0.0	0.0	0.0	0.0
1.0	30	2.0	2.6	0.0	0.0
1.5	40	3.5	3.0	5.0	3.0
2.0	50	4.5	4.3	6.0	4.2
2.5	60	5.0	5.5	9.0	7.0
3.0	68	8.0	7.0	10.5	10.0
3.5	68	11.3	10.0	12.6	12.2
4.0	68	15.5	15.8	15.0	15.0
6.0	68	18.0	18.5	18.5	17.8

*Determined by placing 50g. samples of frozen berries in 60 deg. glass funnels in a room at 68 ± 1 deg. F., and then measuring volume of fluid leaked.

sample. However, the fluid adhering to an individual food particle should depend upon the nature of the surface and the shape of that particle.

In order to evaluate these factors, 24 samples (50g. each) of frozen strawberries were placed on wire gauze disks fitted into glass funnels. The berries in each sample were selected for uniformity of size and shape. A wire gauze support was used so that the berries would be laid out in a single layer to prevent any crushing effect of one berry upon another. The funnels were placed in a room at 68 deg. F., using a 10-ml. graduated cylinder to collect the leakage fluid.

At the end of a 4-hr. period, the berries were removed, quickly rolled on tared paper towels, and the blotted berries weighed. The difference between this weight and the original weight (50g.) was recorded as the total weight loss. The paper towels were weighed, the tare weight subtracted, and the gain recorded as the weight of fluid which normally adhered to the berries. The volume of liquid collected in the cylinders was recorded, and its specific gravity determined and found to be 1.

Therefore, the weight of fluid adhering to the funnel is the sum of the volume collected and the weight adhering to the berries subtracted from the total weight loss of the berries. Data given in Table III show the mean values and their standard deviations.

Leakage Varies

It may be calculated that the percent variation in the leakage, expressed as weight loss of berries, is 16 percent, compared to a 30 percent variation in the leakage based on the volume of fluid collected in the cylinder. It is interesting to note that 2.1g. of fluid adhered to the funnel and that this amount was roughly 20 percent of the total amount exuded by the berries.

Effect of Thawing Rate

Strawberries, from the same lot used to obtain the data shown in Table III, were quick-thawed (in 3 min. instead of 3 hr.). This rapid temperature rise was accomplished by placing the 50g. sample in a high frequency field. At the end of the 3 min., the berries were placed in a single layer on wire gauze disks in a funnel, and the leakage was determined by weight loss after 1 hr. had elapsed.

The individual results obtained on eight samples are shown in Table IV. The mean leakage (total weight loss of the berries) was calculated to be 12.0 ± 4.0g., as compared to 11.6 ± 1.9g. for the 4-hr. results. This is considered a surprisingly good check, although the wide variations in the 3-min. series was disappointing.

Juice Separates in Storage

Leakage tests were run on peach slices that had been frozen both rapidly and slowly. The samples were taken separately from the top and the bottom layers of peaches which had been stored in locker cartons for over a year. Data are reported in Table V as the leakage volume collected during 4 hr. in a 68 deg. F. room.

The results show an apparent leakage from samples taken from the bottom of the boxes to be some 70 to 75 percent greater than that for the samples taken from the top of the box! Moreover, it was noted that the difference in samples taken from the top and bottom of the same container is much greater than that between the slow frozen and the fast frozen samples taken from identical levels.

The magnitude of separation of metacryotic fluid from the peach slices during storage, with resultant migration of the fluid to the bottom of the container, is surprisingly large. This imposes a severe problem in regard to withdrawing a sample of the food for testing. The procedure developed at Georgia Tech calls for weighing a representative sample of the food, freezing the sample in a wire gauze basket of roughly 1-in. mesh, and placing the frozen sample in a cellophane bag. Three such bags were placed in a pint locker carton for storage. If any fluid or crystals separate from the sample during storage, their presence can be noted and an estimate can be made of the amount when the leakage test is run.

Crushing Effect Significant

It is obvious that the pressure to which a food particle is subjected during thawing will affect the amount of leakage. Because of the difficulty of subjecting varying shapes, such as strawberries and peach slices, to a uniform pressure, it seems preferable to subject them to no pressure other than their own weight. In order to determine the magnitude of this pressure factor, strawberries were carefully selected for uniformity in size and shape and divided into four groups. Tests were then run with the berries supported by four different methods during the 4-hr. thawing and leaking period. These were the methods:

1. A single layer of berries was placed in flat-bottomed glass dishes and covered with petroleum ether. The specific gravity of the berries was found to be 0.9, so that the ether of 0.7 specific gravity largely protected each berry from the crushing effect of its own weight.

2. Berries were placed in a single layer on disks of wire gauze in funnels.

3. Berries were placed in 60-deg. funnels having a 5-mm. dia. stem opening. The berries were piled one on top of another, but the narrow stem prevented any berry from fitting into the bottom of the funnel and caused the berries to keystone into the middle portion of the funnel.

4. Berries were placed in 60-deg. funnels having a 10-mm. dia. stem opening. In this case the stem was wide enough to allow a single berry to become wedged into the bottom of the funnel, and the berries formed three layers.

The leakage from berries tested under methods (1) and (2) was determined by weight, whereas the leakage in tests under (3) and (4) was volumetrically determined. For the weight determination, the berries, after 4-hr., were rolled on paper towels and then weighed. By subtracting the

weight of fluid adhering to the berries and to the funnel from the values determined by weight, a comparison between the methods was obtained, as can be seen from Table VI.

It is obvious that the crushing effect is of real significance and that the use of petroleum ether (Method 1, Table VI) to support the berries results in more consistent leakage data.

Thawing in Liquid

When frozen foods are exposed to air at 68 deg. F. for thawing, moisture in the air condenses on them. Later, when the food has reached room temperature, evaporation of moisture from the food occurs. Obviously, these changes can lead to errors in the results obtained in research on thawing factors.

However, when the food particles are immersed in a water-immiscible fluid (previously saturated with water) during the thawing and leakage period, these changes do not occur. The elimination of this source of error, as well as the more reproducible results obtained by the use of petroleum ether, led to the conclusion that such a procedure would be preferable to thawing frozen samples in air.

Since the low flash point of petroleum ether makes it undesirable for use in tests, mineral spirits was experimentally employed. In order to determine whether any of this medium diffused into the food during the test, an oil-soluble blue dye was added to it. After the 4-hr. thawing period, the berries were rolled in a paper towel as before, and when rolled on a second towel, no blue discoloration was observed. When the berries (after one rolling on paper towels) were cut into thin sections and examined under a 12X lens, no blue color was found at or beneath the surface.

Size and Shape Important

Using strawberries of about the same size and shape, the leakage from a series of 10 samples (50 ± 0.5g. each) was determined by the method proposed here. It was found to be 18 ± 1.62, showing a 9 percent variation of the individual samples around the mean. Another series of 24 tests was similarly run on strawberries which had relatively large variations in size and shape, the variations occurring within the individual samples. The leakage result was determined to be 25 ± 4.22g., showing a variation of 16.8 percent around the mean.

It was concluded that the variation in leakage due to random differences in the size and shape of the food particles is greater than the intrinsic variations due to the method itself when the leakage is determined by weight loss.

Reporting Values

When inherent variations are of the magnitude encountered in the leakage determinations illustrated in this report, it is necessary to apply a mathematical treatment to the results obtained. Otherwise, apparent differences may be reported as real differences, and spurious conclusions may be drawn. In any case, it is always desirable to be able to compute and report a single figure to represent the result of data obtained by several determinations on identical samples.

The most common figure so used is the arithmetic mean. But when inherent variations are present, the reporting of the mean is not satisfactory in itself—for it is also necessary to show the variation of the individual determinations around the mean.

The standard deviation is probably the simplest method of accurately describing this variation, and it has been adopted for the work herein reported and for the proposed new method.

The standard deviation (SD) of a small number of observations (less than 25) from the mean is defined by the following equation:

$$SD = \sqrt{\frac{\Sigma (ID)^2}{n-1}}$$

where ID is the difference between an individual result and the mean (average) result; $\Sigma(ID)^2$ is the sum of the squared differences; and n is the total number of observations. The mean, m, is determined, as usual, by:

$$m = \frac{\Sigma X}{n}$$

where X is the value of an individual determination ($ID = X - m$, or $ID = m - X$).

In order to determine whether or not there is any significant difference between two means, the standard error of the difference of the two means is determined:

$$SE \text{ of difference} = \sqrt{\frac{(SD_1)^2}{n_1} + \frac{(SD_2)^2}{n_2}}$$

If the difference between the two

(*Turn to page* 209)

Results are Influenced by Variation in Test Procedures

TABLE III—BERRIES AND FUNNELS Retain Large Quantities of Leakage*

	Results	
	Average of 24 Samples	Standard Deviation
Total weight loss of berries, g.	11.6	±1.9
Weight of fluid adherent to berries, g.	3.6	±1.0
Weight of fluid adherent to funnel, g.**	2.1	±0.8
Volume collected in cylinders (sp. gr. = 1.0)	6.0	±1.8

*Determined by placing 50g. sample frozen berries in a single layer on wire gauze in a funnel for 4 hr. in a room maintained at 68 ± 1 deg. F.

**Any losses by evaporation would appear in this figure. Figures shown were determined by difference. When determined directly by weighing funnel, result was found to be 1.8 ± 0.8.

TABLE IV—RAPID THAWING* Gave Variable Results

Sample No.	Leakage, Total Weight Loss (g. per 50g. sample)
1	12.0
2	12.0
3	16.5
4	9.0
5	8.0
6	8.5
7	10.5
8	11.5
Mean	12.0 ± 4.0

*Determined by thawing frozen strawberries in 3 min., then placing berries on a wire gauze for 1 hr. in a room maintained at 68 ± 1 deg. F.

TABLE V—JUICE MIGRATES to Bottom of Container During Storage

	Leakage* (ml. per 50g. Peach Slices)			
	Sample From Top of Container		Sample From Bottom of Container	
Method of Freezing	No. of Samples	Mean SD	No. of Samples	Mean SD
Slow: 0 deg. F. still air 5 hr. freezing time	10	8.0 ± 2.5	10	14.2 ± 2.1
Rapid: 10 deg. F., immersion in alcohol. 5 min. freezing time	20	7.2 ± 1.9	20	12.3 ± 2.3

*Determined as net volume of fluid from samples placed in a funnel for 4 hr. in a room maintained at 68 ± 1 deg. F.

TABLE VI — CRUSHING Increases Leakage* From Strawberries

Method of Support	No. of Samples	Weight Loss Mean and SD	Volume Collected Mean and SD
(1) Single layer immersed in petroleum ether	6	8.7 ± 0.8	3.2 ± 0.8
(2) Single layer on wire gauze	24	11.6 ± 1.9	6.0 ± 1.8
(3) Two layers in 60 deg. funnel, 5 mm. stem	24	. . . . .	8.7 ± 3.1
(4) Three layers in 60 deg. funnel, 10 mm. stem	10	. . . . .	11.5 ± 2.0

*Determined by holding 50g. samples for 4 hr. in a room maintained at 68 ± 1 deg. F.

Students alternate their time between food plant and school. While one works in plant . . .

. . . another carries on academic studies in laboratories and classrooms at I.I.T.

Illinois Tech Combines Engineering With Food Technology

Cooperative student-worker plan, developed with Wilson & Co., provides academic training along with practical, packing plant experience—Part II

M. E. PARKER

Director of Food Technology Program, Illinois Institute of Technology, Chicago

The curriculum for the Food Technology Program at Illinois Institute of Technology for the four-year undergraduate, graduate, and cooperative students' courses was outlined in these pages last month. To exemplify how the cooperative program functions, the College Co-operative Training Program of Wilson & Co. is presented here in considerable detail.

Utilization of both industrial and academic training to prepare young men for careers as food technologists is relatively new. Wilson & Co., as one example, has been participating with a number of colleges, in recent years, in building such a program.

Likewise, Illinois Tech's plans call for the cooperation of food manufacturers in various branches of the industry in developing its new course in food engineering and technology.

This coordinated program has the objective of giving industrious young men of above-average intelligence and capability an opportunity to obtain a college education, preparatory to an academic degree, while also acquiring practical industrial experience in meat processing. It also provides Wilson & Co. with technically and industrially trained personnel from whom the company can select those qualified for technical and future supervisory positions in the operating and management departments.

Individuals who may become employees of the company, as well as those already in its employ, may be eligible for participation in the program. Specifically a candidate must:

1. Be a high school graduate with above-average scholastic record.
2. Show evidence of ambition and aptitude for the field of work under consideration.
3. Show evidence of leadership.
4. Show evidence of good health.
5. Be between the ages of 18 and 22 years, subject to waiver for exceptional cases.
6. Make formal application to and be approved by the company and satisfy the entrance requirements.
7. Show satisfactory assurance of sufficient funds to finance the course over and above the projected earnings while working for the company.

Prior to admission of the candidate to the course, the school shall examine the candidate's high school record. The company also may make an independent investigation to satisfy itself that the candidate meets all requirements.

In keeping with the company policy of "promotion from within," the candidates are chosen from employees whenever possible, and certain of the eligibility requirements are subject to waiver or modification in cases where such action is warranted.

Alternate Assignments

The plan is administered from the office of the packing company's director of supervisory training, in cooperation with department heads. Since five years are necessary to complete the entire program, the ideal setup is to have two men begin the program at the same time and alternate between school and work assignments. The needs of the company, however, determine the number of applicants admitted to the program. Each participating student alternates school and work assignments based on the college semester, as indicated in the following example:

Period	Schedule
Sept. to Feb. (19 weeks).....	School
Feb. to June (17 weeks).....	School
June to Aug. (9 weeks).....	Work
Aug. to Sept. (4 weeks).....	Work

Compliance with this schedule means that, when the 241-week program is completed, the student will have finished 118 weeks of school and 123 weeks of work, after allowance for vacation periods.

The work assignments are of a rotational nature, with emphasis on a broad and clear understanding of basic problems, methods, practices and procedures to give each student diversified experience and training. Although the program has an established work assignment schedule, it is flexible enough to permit deviations from the regular pattern when deviation becomes expedient.

Job performance and school grades of each student are reviewed periodically with him by the training director. If he has not been making satisfactory progress, he is counseled and given an opportunity to improve his performance. Each student is required to maintain an interest in the company's welfare throughout the program and show evidence of progress. Lack of interest in the company's part in the program and continued failure to develop and make progress result in the student being dropped.

During the period of the final work assignment, each student has an opportunity to declare the field of work in which he has the most interest and prefers to follow. Final placement, however, is determined by the company and is based on the student's demonstrated fitness for positions open at that time.

Job security is intended for each student throughout the program. Conditions beyond the control of the company may, however, necessitate its termination. For that reason, the company does not guarantee to place each student permanently, and it reserves the privilege of terminating the program at any time. The company does protect each student, however, to the extent of making every reasonable effort to provide suitable employment, dependent upon prevailing business conditions.

Permanent record of each student is kept in the form of reports. The originals are filed in his personnel folder, with copies going to the director of supervisory training and interested supervisors. The record is comprised as follows:

Student reports; supervisor reports (see appraisal form accompanying this article); training director's report, covering every conference held with the student or the placement committee regarding the student's job performance; and college reports, made periodically to the director of supervisory training and covering the student's grades and progress in his college subjects.

Students not currently employees of the company when they sign up for the College Co-operative Training Program, become employees when they

SUPERVISOR REPORT—Cooperative Student Appraisal Form

TRAITS	Outstanding	Excellent	Good	Fair	Unsatisfactory	REMARKS	Value	Weight	Score	Maximum Possible Score
I. PERSONALITY										
Appearance. Consider dress, physique, mannerisms, and voice.										
Social Compatibility. How does he get along with others; is he courteous, tactful and considerate of others?										
Character. Consider dependability, sincerity and honesty. Is he indifferent, or can he be trusted with responsibility?										
Leadership. Consider self-control and poise, impression made on others, qualities of inspiration, fair play, patience.										
II. ATTITUDE										
Attendance. Consider attitude toward time lost, regularity, absenteeism, stretching rest and lunch periods.										
Safety. Consider respect for safety rules and regulations, carelessness, recklessness. Is he safety conscious?										
Cooperation. Consider enthusiasm, interest, and willingness toward job and working with fellow employees.										
Initiative. Consider desire to learn and assume new work, aggressiveness and alertness, flexibility and ingenuity.										
III. ADAPTABILITY										
Quality of work. Consider promptness, neatness, accuracy.										
Knowledge. Consider proficiency in acquiring skills required on the job.										
Ability. Consider analytical and reasoning powers, planning, readiness to grasp new instructions and assignments, constructive thinking, judgment.										
Potential. In the light of all the trainee's characteristics (whether included or not in the above), to what degree do you feel he is executive or administrative material?										
TOTAL										

Scale of Rating Values		College Rating		Weight Requirements for Job	
Outstanding	8	A	80	Essential for filling job	4
Excellent	6	B	60	Desirable for filling job	3
Good	4	C	40	Not necessary for filling job	2
Fair	2	D	20		
Unsatisfactory	0	E	0		

actually start on their work assignments—not necessarily when accepted for participation in the training program. Employees participating in the program are part-time employees—they are on the company payroll only during the periods of work assignment and are paid only for time actually worked. Each student is paid weekly.

The procedure of the dual relationship is that, upon completion of each work period, each student resigns his position with the company to re-enter school, and he is rehired by the company at the start of each subsequent work period. When the program is completed and the student is finally placed, he becomes a regular full-time employee of the company, in a position open at that time and for which he has demonstrated fitness.

He is eligible, at that time, to participate in all employee benefits offered other regular employees, and he receives credit for his total previous service under the program for calculation of vacation time. This means that his vacation service date predates his final placement date by the total length of time spent on work assignments with the company.

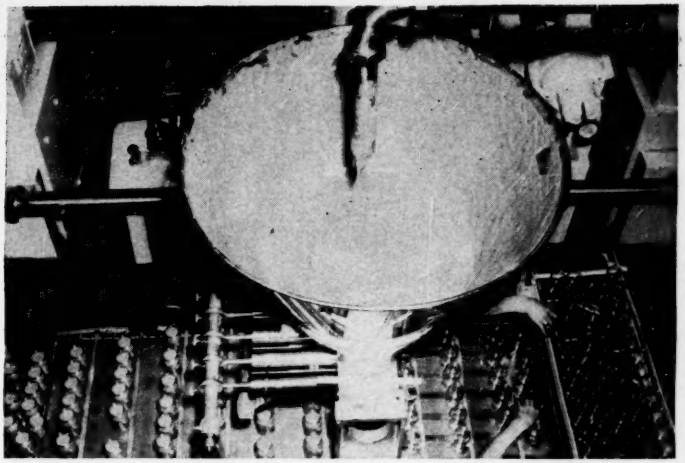
Regular Employees

Students currently employees of the company when selected to participate in the training program, retain their status as regular employees. They are given a leave-of-absence-without-pay when they leave the employ of the company to go to school, and they are re-instated by the company at the start of each subsequent work period.

In its entirety as well as detail, the College Co-operative Training Program is not to be interpreted to be a means of providing preferential treatment for those participating in it. None of its provisions are to interfere with the normal supervisor-employee relationship between the student and his current supervisor nor the normal faculty-student relationship between the student and his professors.

The program is intended: To aid the participating company in obtaining technically and industrially trained personnel; to give deserving and capable young men an opportunity to better themselves academically and professionally; and to make available to colleges and universities a group of students that would not be possible by other means.

ON THIS FORM, each student is gaged by his packing house supervisor relative to his showing in the work portion of his course. Personality, attitude, and adaptability are accented, and student's score is coordinated with his college rating.



Peanut butter is filled into jars at high speed in plant of Cinderella Foods, Dawson, Ga.

SPECIAL FOOD INDUSTRIES REPORT ON . . .

PEANUT BUTTER

Advanced unit operations and processes are employed in the efficient manufacture of quality product. And shelf-life is extended by new knowledge about effects of added ingredients and proper storage conditions

J. G. WOODROOF,
HELEN H. THOMPSON,
and S. R. CECIL
Georgia Experiment Station, Experiment, Ga.

The greatest single use of peanuts as a food is in the manufacture of peanut butter. This process is relatively simple, consisting of shelling, dry-roasting and blanching the peanuts, followed by fine-grinding. Salt is put in to improve the flavor, and small quantities of other materials are sometimes added, such as hydrogenated fat or glycerine to prevent oil separation, lecithin or antioxidants to control rancidity, and "secret" ingredients.

Peanut butters may be made from any variety of peanuts. However, a blend of two parts Spanish or runner peanuts with one part Virginia peanuts is considered best for the most desirable consistency. The peanuts are blended in the desired proportions as they are fed into the grinder.

Manipulation of temperature and grinding to produce a uniform, high-quality, sanitary product requires a definite procedure. This is indicated by the wide range of colors, flavors and consistencies of peanut butters on the market, all made from almost identical varieties of peanuts.

Some peanut butters have a heavy-roast color and flavor, others have light-roast characteristics, and there are many gradations between. In an attempt to make peanut butters that are different in color, flavor and texture, some manufacturers include large pieces of peanuts, others add flavors such as malt, orange, ham and cheese.

Major manufacturing operations should be synchronized and should include properly engineered equipment for conveying, temporary storage, and gravity transfer. The operations should function smoothly with a minimum of fuel, labor, space, power, maintenance and spoilage. This requires an overall engineering job of adapting plant assemblies to the particular building in which they are to be used, and it is as important as the engineering of the equipment.[1]

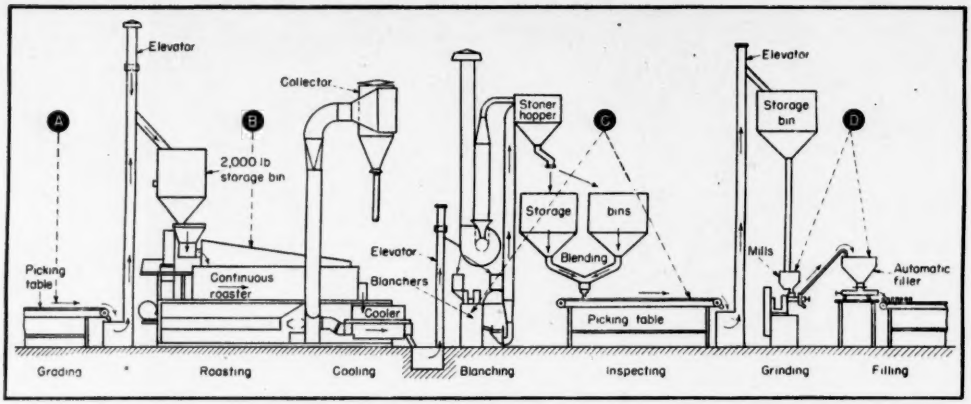
Six steps are required in the manufacture of peanut butter. They are:

1. Shelling and cleaning. Necessarily, shelling of the nuts produces a lot of dust, a part of which settles on the shelled kernels and adheres closely. Fortunately, the skins are subsequently removed by blanching and the white cotyledons beneath are left perfectly clean. For cleaning to be complete, only unbroken, or U. S. No. 1, shelled peanuts should be used in making peanut butter.

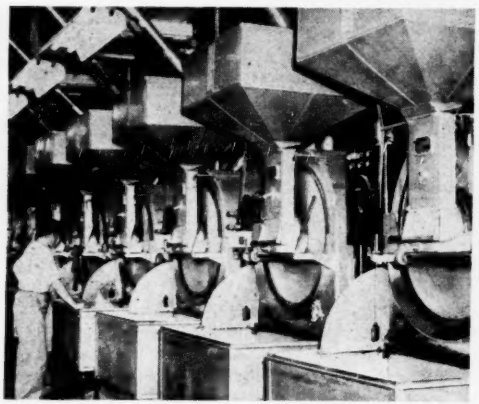
A second important phase of cleaning is the removal of all discolored or rotten nuts. A single rotten nut ground with the best selected peanuts will impart an undesirable flavor to several pounds of peanut butter. Much of the grading is done by hand on conveyor belts under special lights, although some of it is done mechanically by electric eyes.

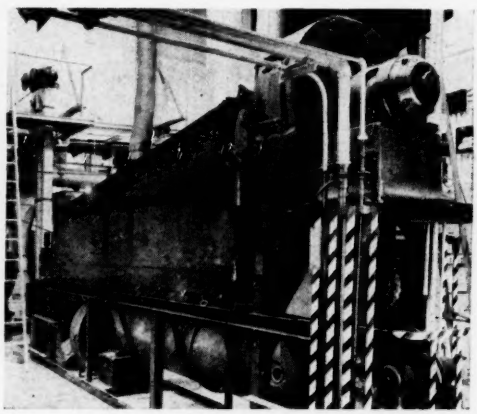
By shelling and cleaning the nuts as needed for the roasters, the possibility of contamination by insects, molds, rodents and foreign flavors, is greatly reduced. If shelled peanuts are

One-Story Operation Characterizes Peanut Butter Manufacture

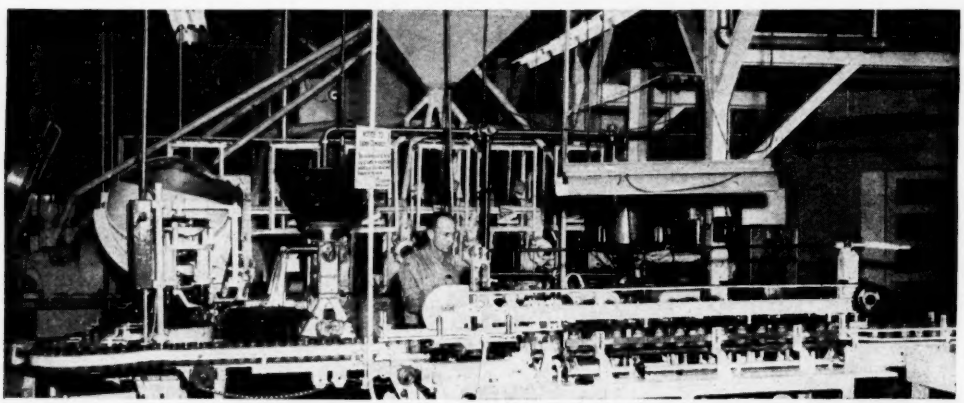


OPERATIONS involved in manufacture of peanut butter are traced in flowsheet above. In accompanying pictorial panels, reference letters of captions key with indicated points on the flowsheet.



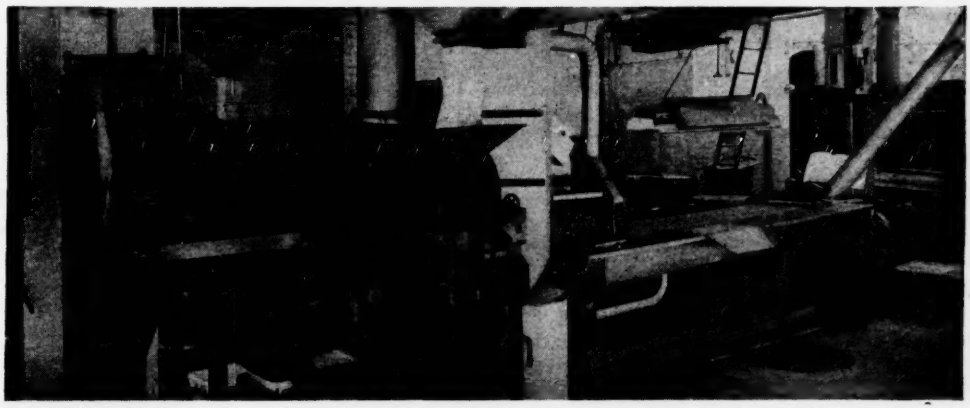


B **ROASTING.** Batch roasters (left) holding 400 lb. of shelled peanuts each, are used in many plants. But continuous roasters (right), with capacities of 1,800 lb. per hr., are meeting with approval of larger operators.



D **GRINDING AND PACKAGING.** Blanched peanuts are ground with salt and other ingredients such as hydrogenated oil, then filled into glass jars (rear). Jars are closed (left), and labeled for distribution (right foreground).

A INSPECTION before roasting. Shelled peanuts are carefully graded to remove discolored and rotten nuts, stones, and other foreign matter, detrimental to quality of finished peanut butter.



C BLANCHING. After roasting, skins and germ are removed and separated from peanut kernels in blancher (left). Blanched nuts are then blended to produce the desired flavor and go to inspection table (right) before grinding.

to be held for more than a few weeks, they should be stored in odor-free refrigerated warehouses at 32 to 34 deg. F., and at a relative humidity of 70 percent or lower.

2. Roasting. Peanuts used in the manufacture of peanut butter are roasted by one of two methods—batch or continuous. In the opinion of some operators, batch roasters have many advantages that cannot be met by one big continuous roaster. In the first place, peanut butter calls for a blending of peanuts, and the different varieties must be roasted separately.

Moreover, peanuts frequently come in lots of different moisture content which need special attention during roasting. This can be done more satisfactorily in batches than by continuous roasting. A third point in favor of batch roasters is that a plant can cut out or add on one or more roasters to meet variations in production.

In the batch method, peanuts are roasted in 400-lb. lots in a revolving oven heated to about 800 deg. F. The peanuts are heated to 320 deg.[3] and held at this temperature for 40 to 60 min. to obtain a satisfactory roast.

Not only must each batch be roasted the same, but all of the nuts in the batch must be uniformly roasted. There should be even and complete development of color from the center to the surface of each kernel, without scorching, excessive oiliness, or decomposition of surface fats.

The first effect of roasting is rapid drying, in which the moisture content is reduced from a normal of about 5 percent to ½ percent.[3] This is followed by the development of oily translucent spots on the surface of the embryo, called "steam blisters," caused by oozing of oil from the cytoplasm as free oil.

Change in color is due to the cell walls becoming wet with oil. This stage is referred to as "white roast." The skins, too, become wet with oil, and darker in color. The final stage of roasting is the development of a brown color, at which time the peanuts are done or "brown roasted."[4] Color and flavor of peanut butter is dependent on the extent to which brown roasting is allowed to proceed.

Many believe that brown roasted peanuts are more palatable and therefore prefer peanut butter with the darker color. Higgins et al[5] found that roasting and blanching peanuts for peanut butter reduced the thiamin chloride content from 9.6 micrograms per gram to 0.7; while the niacin con-

Proper Roasting Is Necessary for Highest Quality

UNIFORMLY roasted peanuts have no burnt spots, are easy to blanch.

IMPROPERLY roasted peanuts are scorched and hard to blanch.

tent remained unchanged—17.2 meg. per 100 g.

During the last 10 yr., the trend among large manufacturers has been toward continuous roasters. Advantages claimed are: Saving in labor; more uniform roasting; smoother operations and decreased spillage.

Backer [6] came to the conclusion that for roasting peanuts radiant heating offered no advantage over the usual method of heating by convection. He found that the convection type roaster having automatic control of temperatures from 850 to 900 deg. F. required little or no skill on the part of the operator, was economical to operate, and delivered a uniformly roasted product.

High roasting temperatures (2,000 deg. F. and above) are undesirable. They break down the oils, scorch the surface of the peanuts, and char the broken pieces of loose skin. Soot and smoke caused by burning chaff within the cylinder, also result from these high temperatures. This charred fiber and soot may be rubbed into the greasy surface of the peanuts, dulling their luster and producing a smoky taste.

3. Cooling the peanuts. Heat should be removed from roasted peanuts as quickly as possible in order to stop cooking at a definite point and to produce a uniform product.

In the plant, the hot peanuts pass from the roaster discharge directly to a perforated metal cylinder or cooler box, where a large volume of air is pulled through the mass by suction fans. The coolers should be designed so that the air is distributed uniformly and the product cooled evenly.

4. Blanching. Before the grinding, roasted peanuts are whitened or blanched by removing the skins. The hearts are usually removed at the same time. As the peanuts pass through the blancher in a continuous stream, they are vigorously rubbed, and the loosened skins are blown off while the hearts are removed by screens. During blanching there is a loss in weight of about 5.2 percent as skins and 4.1 percent as hearts. These byproducts are used in stock feed or for oil recovery. Total loss in manufacture amounts to about 15 percent.

5. Picking and inspecting. The blanched nuts should be screened and inspected to remove scorched and rotten nuts, and rocks or other foreign or undesirable matter. This is preferably done on a conveyor belt. If all previous handling steps have been properly carried out, picking and inspecting can be done rapidly.

6. Grinding the prepared nuts is one of the simplest, yet one of the most delicate operations in the plant. About 2 percent salt, and other ingredients if any, are fed into the grinder with the peanuts. The heat generated during grinding may melt hydrogenated fat, or the fat may need to be premelted. Grinding will also disperse the other ingredients. The grinding mill should be adjustable, have automatic feed for peanuts and salt, and be easy to clean.

Peanuts should be kept under constant pressure from the start to the finish of the grinding process, in order to assure uniform grinding and mixing and to release enough oil to hold the mass together. A heavy screw feeds the peanuts into the grinders and may also be used to deliver the butter into containers in a continuous stream under even pressure.

Cooling peanut butter might be termed a seventh step. During the grinding operation, peanut butter becomes quite hot, especially when it is very finely ground. It may reach a temperature of 145 deg. F. or higher; this is an advantage in filling containers, since it eliminates air bubbles.

Peanut butter is usually packed and stored hot; and though some manufacturers have recently been interested in artifically cooling the product before labeling and packaging, the practicality or need for rapid cooling has not yet been demonstrated.

Packaging

Less than two decades ago, much peanut butter was sold in bulk and retailed in paper trays for as little as 8c. per pound. Today, the only peanut butter distributed in this manner is that going to bakers, candy manufacturers, or other large consumers. It may be shipped in friction-top tins, pails or wooden casks. Since exposure to air produces rancidity, peanut butter for the retail trade is packed in air tight containers. Much of it is packed under vacuum.

In some instances, jars are filled directly from the grinding machine, while in others the ground product is run into automatic fillers from which the jars are filled. After being filled, the jars are closed, labeled, and placed in cartons by automatic machines. Due to the low moisture content of peanut butter, there is no requirement for heating to prevent spoilage due to bacteria or fungi.

Experiments suggest that the shelf-life depends largely upon the quality of peanuts used—that high-grade peanut butter cannot be made from peanuts that were cured at too high temperature, as when exposed to direct sun rays in 98 deg. F. weather; or when they are cured at a humidity sufficiently high to cause discoloration.[5]

PEANUT BUTTER KEEPING QUALITIES

Many factors, including the method of curing and storing the raw peanuts [4], and the method of manufacturing and storing the peanut butter, determine how long it will remain good on the grocer's shelf.

In an effort to determine the effect of various factors upon this shelf-life, a number of experiments were conducted. Twenty commercial brands of peanut butter, packed in 16-oz. jars, were stored at room temperature for 600 days. Chemical and organoleptic tests were made periodically. The aroma and flavor of some of it was poor to begin with. These samples were unpalatable in 100 days, while one lot was excellent after 600 days in storage. Most of the lots were fair for about 300 days.

As it averaged out, the fresh peanut aroma and flavor decreased gradually, and rancidity increased steadily, for about 300 days. After this time, however, the "apparent" rancidity, as detected by aroma and flavor, increased only slightly for the remainder of the storage period. Peanut butter held for 500 days was almost equal, in palatability, to similar lots at the end of 300 days.

There was a gradual increase in the amount of free oil on the surface of the samples for approximately 300 days. The amount varied from a mere trace on the surface of four lots, to a layer more than 1-in. thick in the case of one lot. The average maximum thickness was slightly more than ½-in. After 300 days in storage, the thickness of the layer of oil increased only slightly. In all cases the quality and storage life, of the 20 commercial brands of peanut butter, appeared to have been predetermined by the quality of peanuts and manner of manufacturing.

Shelf-Life Extended by Refrigeration

Tests, to determine the effect of storage temperature on the shelf-life of peanut butter, extended as long as 600 days and included five temperatures. Chemical and organoleptic checks were run periodically throughout the experiments. The results are recorded in Table I.

Effect of storage temperature on oil separation was very marked. All lots stored at 50 deg. F. or lower had no oil separation, irrespective of the storage period. Lots stored at approximately 50, 60, 70 and 80 deg. F. had respectively, 0, 5.6, 7.5, and 8.1 mm. of separated oil at the end of one year.

Effect of different storage temperatures on the rate at which the peanut butter became rancid was not great, though in practically every case the peroxide number, and the free acid, were lowest in the sample stored at the lowest temperature. Only that stored at about 85 deg. F. was rancid at the end of one year. Averages of peroxide numbers for peanut butter stored at the five temperatures were 8.3, 5.6, 5.6, and 5.2; figures representing percent free acid were in the same order.

Differences in palatability were in favor of refrigeration, with results more marked than those for rancidity, but less marked than those for oil separation. If peanut butter is to be held for more than a few weeks during the summer it should be cold stored as a protection against oil separation and rancidity. But refrigerated storage is much more important for holding raw stock for continuous year-'round operation. This has been found satisfactory for protecting shelled peanuts against insects and rancidity, and for preserving the fresh flavor and color.[5]

To determine the effect of light upon peanut butters, samples of 20 commercial brands were placed in the light and dark at room temperature, and examined regularly over a period of 606 days. The oil which collected on the surface of the jars placed in the light, was 31 percent greater than that on the surface of those in the dark. In 200 organoleptic examinations, there was a detectable difference in flavor between samples stored in the dark and in the light (in aroma, 20 percent,

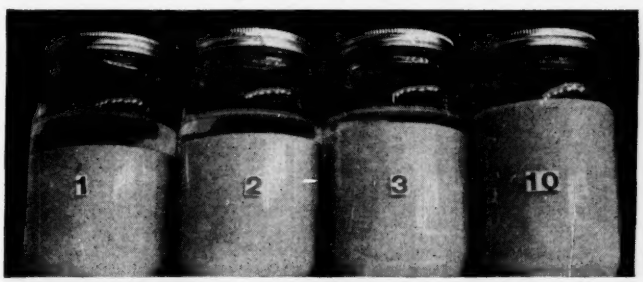
Storage Temperature and Grind Affect Oil Separation

TABLE I—DATA SHOWS How Fineness of Grind Influences Oil Separation

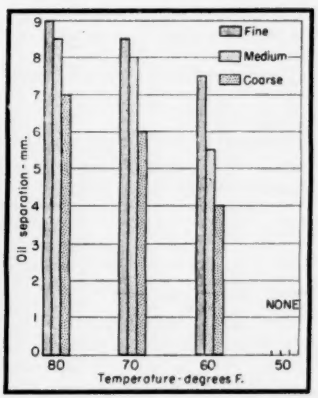
Grind	Storage Temperature deg. F.	Oil Separation in mm. After 5 Months	Oil Separation in mm. After 12 Months	Rancidity After 12 Months: Free Acid as Oleic, Percent	Rancidity After 12 Months: Peroxide Number mm. O per kg. Oil
Coarse	84–85	4.8	7.0	.73	7.7
Medium		5.3	8.5	.78	8.1
Fine		6.0	9.0	.75	7.3
Coarse	69–75	2.3	6.0	...	5.8
Medium		3.0	8.0	...	6.6
Fine		3.5	8.5	...	5.5
Coarse	58–64	1.5	4.0	.63	5.3
Medium		2.3	5.5	.70	6.3
Fine		3.0	7.5	.67	5.2
Coarse	49–50	0	0	.63	5.2
Medium		0	0	.67	6.2
Fine		0	0	.65	5.1
Coarse	38–39	0	0	.62	5.0
Medium		0	0	.64	5.7
Fine		0	0	.63	4.9

TABLE II—REMIXING Increases Oil Separation in Peanut Butter at Temperatures Above 50 Deg. F.

Storage Temperature deg. F.	Oil Separation After 5 Months' Storage: Remixed Peanut Butter mm.	Fresh Peanut Butter mm.	Increased by Remixing Percent
84–85	8.8	5.0	43.2
69–75	5.8	3.3	43.1
58–64	4.5	2.8	37.7
49–50	0	0	0



WHEN STORED at room temperature, oil separation is greatest in finely ground peanut butter. (1) Fine, (2) medium, (3) coarse. Sample 10 shows how storage at 36 deg. F. for 1 yr. prevented oil separation.



GRAPHS show oil separation after year of storage.

and in flavor 24 percent of the examinations). In 174 chemical determinations, the free acid values averaged 0.373 for samples in the light and 0.345 for those in the dark; the peroxide numbers averaged 4.06 for samples in the light and 4.05 for those in the dark.

From these data it seems that there was a significant difference in favor of storing peanut butter in the dark. It could be measured in terms of oil separation, and detected in aroma and flavor, but was not significant from chemical determinations.

Effect of Salt

It has been noted that addition of salt to sausage and other types of meats increases the rate of the development of rancidity[7]; and in order to determine if the addition of salt had the same effect upon peanut butter, an experiment was set up, using identical lots except that one lot was salted as usual and the other was not salted. Tests, run after 30 and 90 days, showed that there was no apparent difference in rancidity as indicated by aroma, flavor, peroxide number or percent free acid.

A similar test was run on salted and unsalted oil-roasted peanuts, and on refined peanut oil, with the same results. This is probably explained by the fact that the moisture content of the peanut products was very low and little of the salt was dissolved.

Hearts and Skins

The removal of hearts and skins from peanuts before grinding reduces the amount of peanut butter by about 10 percent. To determine the specific effects of leaving hearts and skins in the product, three lots of peanut butter were prepared—one from completely blanched peanuts with both the hearts and skins removed; another from unblanched peanuts with both hearts and skins included; and a third with only the skins removed. The peanut butters were stored at room temperature, and periodic examinations were made for one year (see Table III).

The effect of including the skins was more detrimental to the appearance than to the flavor. The ground skins appeared as small dark spots throughout the butter, giving it an unattractive appearance. Since the skins contain a great deal of dirt which cannot be removed by washing or brushing, they should be removed for sanitary reasons. Peanut hearts were objectionable in that they imparted a dull gray color and bitter taste.

In an effort to develop methods for controlling oil separation, experiments were conducted with various sizes of grind and with refrigerated storage. Peanuts were commercially ground to three degrees of fineness—coarse, medium and fine—and stored—for one year at 84 to 85, 69 to 75, 58 to 64, 49 to 50 and 38 to 39 deg. F., respectively, to determine the amount of oil separation and rancidity. Peanut butters were tightly packed in glass tubes 1½ x 10 in., so that the oil layer could be easily measured. Tests were run in duplicate after 5 and 12 months storage periods. Results are given in Table I.

Oil separation at temperatures above 50 deg. F. was 103 percent greater after 12 months than at the end of 5 months, indicating that separation continued at almost the same rate throughout the year. Oil separation was greatest in the finely ground peanut butter, slightly less in the medium, and least in that which was coarsely ground. Using 100 to represent the amount of oil separation in the finely ground peanut butter, 88 and 67.5 represented that for the medium and coarse products, respectively.

Storing peanut butter in cool places markedly retarded oil separation, and holding it at 50 deg. F., or lower, prevented separation entirely. Oil separation was decreased about 10 percent for each 10 deg. drop in temperature from 80 to 50 deg. F.

The effect of fineness on the rate at which peanut butter became rancid was very slight, and not considered significant. There was an increase in both free acid (as percent oleic) and peroxide number (mm. O per kg. oil) with the higher storage temperatures but, due to the small amount of exposure to air, none of the samples became rancid.

Other Factors

Since oil separation is the result of settling of the peanut butter, tests were run to determine if factors other than size of particles influenced the rate of settling.

Effect of shaking was a point in question. Identical jars or tubes of peanut butter were stored: (1) In a very still place, (2) on top of an electric refrigerator where they received considerable vibration, and (3) in the back of a car, where they were hauled about for several months. Those that were stored in a still place had less oil separation than those which were shaken.

In another experiment, peanut butter in which a considerable amount of oil separation had already occurred, was remixed and stored in tall glass tubes by the side of a freshly made product for one year at each of four temperatures.

At the end of five months approximately 40 percent more oil had risen to the surface of the remixed butter, than in freshly made butter (see Table II). After one year, the amount of oil on the surface of all of the lots had increased proportionately. In every case, the lower the temperature the smaller was the amount of oil on the surface, and no separation occurred at 50 deg. F. or lower.

These experiments indicated that the more peanut butter was mixed, stirred, shaken, or jolted, the greater was the tendency for free oil to collect on the surface. Therefore, one means of reducing the amount of oil separation is to stir or handle the product as little as possible.

Appearance and Flavor are Affected by Hearts and Skins

TABLE III—WHEN HEARTS AND SKINS are Included, Quality of Peanut Butter is Reduced

	Time Stored, Days	Appearance*	Aroma*	Flavor*	Rancidity: Peroxide Number mm. O Per kg. Oil	Rancidity: Free Acid Percent as Oleic
Without hearts and skins	0	10	10	10	6.1	.18
	90	10	8	8	6.9	.84
	180	10	7	7	8.4	.21
	365	10	3	3	19.6	.20
With hearts and skins	0	6	10	8	5.2	.29
	90	6	8	7	5.7	.32
	180	6	8	7	8.2	.36
	365	6	8	7	4.0	.39
With hearts alone	0	7	9	6	0.8	.26
	90	7	6	4	7.0	.39
	180	7	6	4	7.0	.42
	365	7	6	3	20.8	.49

*The higher the number the more desirable the quality.

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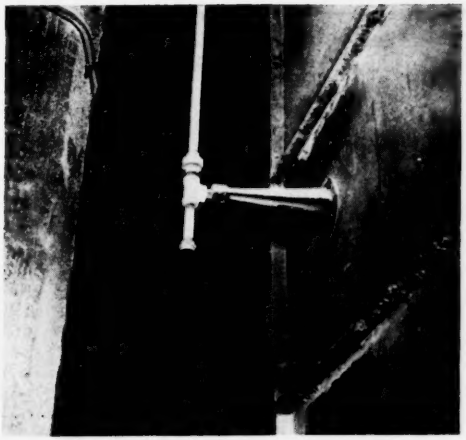
Its stores are now defended from flames . . .



. . . by auto-acting carbon dioxide nozzles.

Grain Elevator Gets Automatic CO_2 System For 'Round-the-Clock Fire Protection

Mechanical safeguards are built into drying ovens and cooling rooms for quick smothering of any blaze in 400,000-bu.-capacity storage facility

S. G. FRECK
Manager Industrial Division,
Walter Kidde & Co., Inc.
Belleville, N. J.

Fires in grain elevators, flour mills and plants processing foods increased fully 50 percent in 1948—making a total of almost 1,000 fires with losses amounting to over $30 million*. In view of these hard facts, there is particular significance in the successful installation of an automatic carbon dioxide fire extinguishing system in the modern grain elevator and storage building of the National Oats Co., Corneo Products producer of East St. Louis, Ill.

This new system gives 24-hr. protection against damaging fires, which are always possibilities in elevators and storage buildings where grain is stored long enough to produce conditions for spontaneous combustion. Also, the induced heat drying of the grain augments the hazards of flammable dust mixtures. Moreover, there are the common dangers of ignition from faulty electrical equipment or defective wiring.

Now, with the installation of the new equipment, the East St. Louis company has new security against costly fires that could destroy up to 400,000 bu. of grain stored in the 42 bins. Besides this, the carbon dioxide does not leave a messy residue, does not damage foods, and has the additional feature of being a non-conductor of electricity.

This is the first automatic carbon dioxide installation in use in grain elevators, and it is also considered to be applicable for use in many other food storage places where fire is a hazard. In National Oats' operations, liability of fire is greatest in the drying and cooling chambers.

A fire in either of these two enclosed spaces would be very difficult to detect, besides being practically impossible to combat with hand portable equipment. To provide adequate protection against every possible fire risk at these sources, Walter Kidde & Co. designed and installed the new built-in automatic system using carbon dioxide as the extinguishing agent.

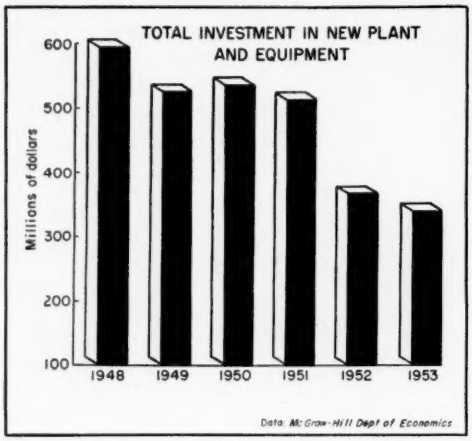
The carbon dioxide is stored as a liquid under 850-psi. pressure in 18 50-lb. cylinders within the building. These cylinders are manifolded together for simultaneous discharge and are connected with rigid piping which runs to a series of discharge nozzles mounted in the walls of the cooling and drying chambers.

Any excessive rate of temperature rise puts the system into action by the use of a Lowe rate-of-temperature-rise actuator. This is, essentially, a small, enclosed, metal air chamber inside a protective wire cage. The mechanism is a metal bellows of "pancake" shape measuring about 3 in. in diameter and 2 in. in maximum normal cross-section. On top of the chamber is a small vent through which air pressures due to normal temperature increases can escape. However, rapid increases in temperature create a shock wave of air pressure that is transmitted through a metal tube leading down to the mechanism of the automatic discharge heads of the CO_2 cylinders.

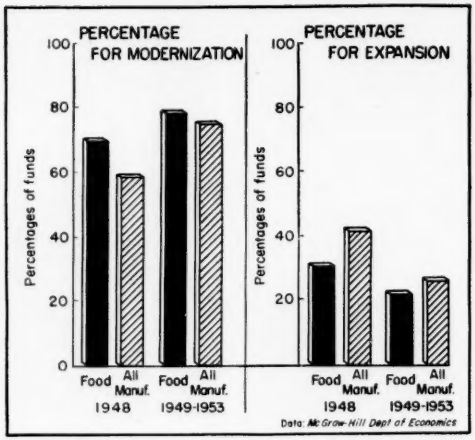
Then the valves open and the liquid carbon dioxide rushes through the piping and out the nozzles, turning into a gas. This inert gas expands in the atmosphere to 450 times its stored volume and completely floods the space where the fire is burning—thereby smothering the blaze by cutting off the oxygen supply.

The pressure of the discharging gas operates pressure trips that automatically stop all machinery, blowers, fans, and the furnace in the plant. For the protection of personnel in the area, there is an alarm gong and a 45-sec. time delay before the system commences to discharge. This allows the workmen time to leave.

* Figures from National Fire Protection Association.



EVEN in the far-from-complete plans for 1952 and 1953, food manufacturers are well ahead of industry as a whole.



SIGNIFICANT factor in these projected plans is that emphasis is placed upon modernization rather than expansion.

Food Industry Spending More for Efficiency

THE food industries plan to continue a high level of investment in new plants and equipment in 1949 and for several years following. That striking fact stands out in an unprecedented survey of capital expenditures conducted by the McGraw-Hill Department of Economics.

It must be emphasized that this is a report on what business *now plans* to spend. Actual expenditures depend largely on unpredictable events in business and politics. Companies throughout industry were asked detailed questions about their investment programs for the next five years, and executives in a carefully selected cross-section of food manufacturing companies gave the following picture:

In 1949, the food companies plan to spend $525,000,000 on new plants and equipment. That would be only 12 percent less than in 1948, although well below the 1947 peak. But more significant is the fact that expenditures are scheduled to stay around the same level in 1950 and 1951.

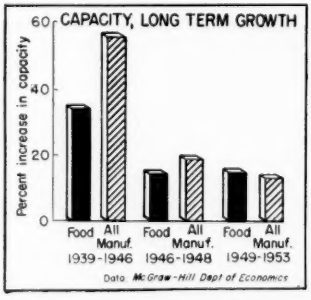
This shows that the food processors are not going to cut down equipment purchases because wartime deficiencies have been made up. In fact, capital expenditures for the food group apparently will decline the least of any industry surveyed. Only the spectacular chemical industry is planning expenditures for 1951 that are as close to the present level. Food-company spending is set to drop only half that of all manufacturing.

Like other manufacturers, food companies are still hazy on plans for 1952 and 1953. Yet they already have over $300,000,000 of projects lined up for each of those years. As time goes on, the accumulation of profitable projects may well result in actual expenditures close to current figures.

In terms of physical capacity, the survey reveals, food processing has more growth ahead than manufacturing as a whole. The food companies expanded much less during the war than heavy industry. But since V-J Day, their capacity has increased nearly as fast. And greater physical growth is projected for 1949-53 than holds true for all manufacturing.

Stress Efficiency

Although capacity will be increased, the emphasis is shifting from expansion to cost-cutting. Some 78 percent of the investment planned by the food industries for 1949-53 is scheduled to go into replacement or modernization, compared with 69 percent in 1948. (Of course many of these improvements will also add to capacity.)



Food companies are among the leaders in stressing greater efficiency. They allotted a bigger share of expenditures for this purpose in 1948 than any industry except steel and automobiles (where there was relatively little expansion). In the next five years, they will still be concentrating more on modernization than most lines.

Opportunities for cost cutting evidently far exceed the funds available. So investment is being restricted to sure-fire projects. (This was true in every industry surveyed by McGraw-Hill.) Two-thirds of the food manufacturers feel that new machinery should pay back its cost within five years; buildings in ten or less.

Food manufacturers expect to have ample cash available from earnings and depreciation reserves to pay for new processing equipment. Very few of the companies questioned intended to raise any part of their funds in the securities market. And only 15 percent of the food companies stated they would increase their programs if they could sell stock on more favorable terms. Some companies declared they would increase capital expenditures if corporate taxes were lower, but fewer said so than in other industries.

Will the demand for food products keep up with expanded output?

The McGraw-Hill survey gives one important indication that it will. Not only the food processors, but all American industry plans several more years of heavy capital expenditures. These programs can insure high employment and strong purchasing power for food products.

We Think . . .

▪ Federal Sugar Control Means Higher Prices, Is Basically Unsound

Food processors apparently will have to pay more for sugar in 1949. As determined by Secretary Brannan under the Sugar Act of 1948, the sugar quotas for producing areas total 7,250,000 tons—a mere 50,000 tons more than the final 1948 quota. The increase is only about 7-tenths of one percent, or less than the expected increase in population.

But some of the domestic sweetener people should be happy. The beet-sugar industry argued in the Washington hearings that the supply of sugar to the U.S. be limited—world supply exceeds demand—so as to increase the price. Wholesale grocers fought a valiant but losing battle for a different result.

Some sugar men believe that the domestic beet industry may fall quite short of its basic 1,800,000-ton quota, especially since the beet crop harvested last fall was down sharply. There is a further possibility that the production deficit will be larger in the Philippines and in Hawaii than anticipated, as has been the case in recent years.

In establishing sugar quotas which will protect the domestic raw sugar industry, Secretary Brannan is merely doing his duty, as he sees it, under a law passed by Congress. If users of sugar don't like the results, they will have to seek repeal or revision of the law. Under advanced ideas as to what are proper international trade tactics, import quotas are frowned upon as "barriers" to progress. Certainly federal control of prices through regulation of supply is contrary to the fundamental concepts of American free enterprise.

There are, of course, arguments in support of the Sugar Act, just as there are in favor of a parity-price law to protect growers of basic commodities at the expense of food processors, food consumers, and taxpayers. The principal argument is that such support is needed to avoid, in one segment of our national economy, a depression which might spread throughout the economy as a whole. Personally, we believe that each part of our economic structure should, like water, be allowed to seek its own level. At most the supporting floors or limiting ceilings should be well away from the normal level so as to permit relatively free operation of basic supply and demand economics.

▪ Reverse Dairy Trends Demonstrate Effects of Normal Economics

Things have been going contrary to seasonal expectations in the dairy industries. And whatever branch of the food field you may be in, these abnormal trends, especially their causes and effects, constitute a lesson in applied economics.

To put it succinctly, the dairy market is a bit screwy. In the March-June period of flush production, raw material prices went up when they should have gone down. Reason: the shortage, combined with high consumer spending power, caused the higher seasonal dairy production to go into consumption instead of storage. Shortages existed in the East and South, and these siphoned off sweet cream and milk from Wisconsin and Minnesota. Meanwhile prices for dairy products had gone high enough to hurt the homemaker when she laid out the cash. And in October the tide turned in the demand for milk and cream on the Eastern seaboard. In the ice cream industry, many dealers kept customers away in large numbers by charging more for pints and quarts than was necessary. Sharply reduced Federal buying of cheese, condensed milk and powdered milk for export and military use helped, of course, to "crack" the market.

What have the contra-seasonal trends done to prices? Milk prices were coming down, as reflected in the decline from $35 million a month to $31 million in the milk checks of Wisconsin dairy farmers. Plymouth, Wis., quotations on cheddar slipped from 47½ cents a pound in July to 36 cents at the year's close. In the Chicago wholesale market, the butter price dropped from 88 cents last March to 60 cents in October and was about 65 cents in late December.

We don't believe the dairy industry as a whole is to blame for the high prices of its products. Rather, these price levels are attributable principally to high prices paid to farmers, to high labor costs, and high freight rates. Which is all the more reason why other food industries should note what has happened.

With consumers in general tightening their purse strings, and with a buyers' market here for many products, the homemaker is being price-choosy as never before in the postwar period. She also is again becoming quality-happy. So even though consumer buying power is expected to remain at a high level in 1949, only the manufacturers who meet the tighter price and quality demands will come through the year with sales colors flying.

▪ Food Technologists Ought To Develop Hypertension Diets

Surprisingly favorable results from the 2,000 calorie rice diet in the treatment of high blood pressure suggest that here is an area deserving the attention of food technologists. As soon as the true mechanism of the nutritional treatment is fully known, it would appear that it should point the way to the development of a class of dietary foods for people afflicted with acute hypertension. Surely there must be other foods than boiled rice that can effect the same benefits and yet be more palatable if only by furnishing variety.

According to findings at Duke University, Durham, N. C., the chief virtue of rice is its freedom from cholesterol. Nevertheless, a recent report by the originator of the diet, Dr. Walter Kempner, before the New York Heart Association, stressed the low-protein, low-salt intake. The elimination of salt seemingly is responsible for starting a chain of reactions that lead to improvement of the patient's health.

It should be emphasized that the foregoing is not yet the basis for embarking on a special food manufacturing program. It is merely suggestive of a line of research attack. If such foods should cost more to manufacture than normal foods, it must be remembered that people will usually pay out good money to avoid dying.

▪ Better Tools for Our Industry Will Contribute to Progress

The standard of living of an individual depends on his own productivity. And the general standard of living depends on overall productivity—which must be measured as the cost, in man-hours, of a unit of goods or services.

Suppose, for example, that John works 40 hours a week and makes 1,000 packages of some food product. In effect, he trades these packages for other foods, for shoes and shirts, for rent, for gasoline or for movie tickets. His ability to make something that other folks want gives him puchasing power, or trading power.

If John has better machinery, better working conditions, or some other factory advantage, he may make 1,200 or 1,500 units of his product. Then at the end of the week he has a larger trading power. He can buy extra gasoline, go to the movies twice or buy a better suit of clothes.

This comparison—not sufficiently accurate to please the professional economist—emphasizes a point of great importance to every executive or operating superintendent in the food business. We must make it possible for every John in the plant to produce more goods in a given length of time. We must invest more capital in better plant facilities. Then John can get more wages and still leave more profit for the stockholder who invests in the machinery to help John do his work. We can even lower the price of the things John makes.

When we so simplify our analysis of the food factory, we inevitably come to the conclusion that it is very important to supply labor-saving devices of all kinds.

▪ Research in Reorganized USDA Must Remain in Skilled Hands

Organization of research in the U. S. Department of Agriculture is important to all elements of the food business. So all of us should concern ourselves seriously with the potential reorganization of that Department, as proposed by the Hoover Commission.

It appears that some people have confused superficial appearance with substance. We refer to the considerable discussion about the proper recognition for, and title of, the executive in the Department who will direct research. At present, that job is filled by a man of outstanding competence, Dr. P. V. Cardon, with the title of Administrator of Agricultural Research Administration. The important thing is that the leadership and direction shall continue in such skilled hands, with adequate recognition in the organization chart for the importance and authority of the post.

Some believe that the man who fills this position should be called "Assistant Secretary." We are not overly impressed by that title. Actually, Assistant Secretaries are not always as important in Washington as their title might indicate. Some are mere political assistants for a Cabinet officer, either to run his official errands or handle his dirty work. We hope that the research in Agriculture will never be led by a person of such limited responsibility and professional standing.

It is worthwhile that all of us emphasize, especially to members of the new Congress, that direction of research in the Department of Agriculture should be by a man with the highest possible professional standing. But in doing this, let us stress the substance of the job, not the title. Indeed, there is some danger that the title of Assistant Secretary might make this post one for a political appointee, rather than one of career status. None of us want that. Then, too, since Assistant Secretaries are appointed, their service lacks continuity, impairing long-range efficiency.

▪ Francis Doctrine for Business Men Has Much Merit

This, in a sense, is a guest editorial. It presents a doctrine for business men projected by General Foods' Clarence Francis in a talk before alumni of Harvard Business School. We think it merits careful study. There is more to it than meets the eye at first glance. This is Mr. Francis' doctrine:

1. Business must be run at an adequate profit and hold its own in fair competition.

2. Business must serve employees, stockholders, consumers and government. And management must keep these elements in balance.

3. Management's operating goals are continuously improved productivity and growth—in order to provide jobs, reward investors, attract capital, and provide more and better goods and services at lower cost.

4. The greatest assets of a business are its human assets, and improvement of their value is both a matter of material advantage and moral obligation. Therefore, employees must be treated as honorable individuals, justly rewarded, encouraged in their progress, fully informed and properly assigned, and their lives and work must be given meaning and dignity, on and off the job.

5. Reputation for integrity is another priceless asset of any business, and management must deal fairly with customers, competitors, and venders, advertise truthfully, fulfill its commitments, cooperate with other managements in the betterment of business as a whole, and oppose any artificial restriction that may limit production, fix prices, or restrain trade.

6. The future of the American economic system depends on the confidence, goodwill, and understanding of the people, and business leadership must make itself a responsible part of the human community by participating in worthy activities locally and nationally.

7. Whenever business has earned a hearing, it has not only a right but a duty to ask for public confidence, and it must speak freely, give information gladly, and answer the attacks of those who seek to undermine American freedom under democratic capitalism.

8. Business leadership is nothing less than a public trust. It must offer a message of courage and hope to all people, and it can help an economically strong America to lead other nations to lasting prosperity, freedom and peace.

All practical business men will agree to Point 1, although many labor leaders and politicians will not. But a lot of good business men are too close to their jobs to appreciate the full significance of some of the other points, particularly 6, 7 and 8. Employees and laymen often don't fully understand the merits of our business system nor appreciate the benefits received from it. It is as much the responsibility of management to "sell" business as it is to sell products. After all, there is competition for the minds of men. Let us not lose by default—the only way democratic capitalism can lose with all its proved merits.

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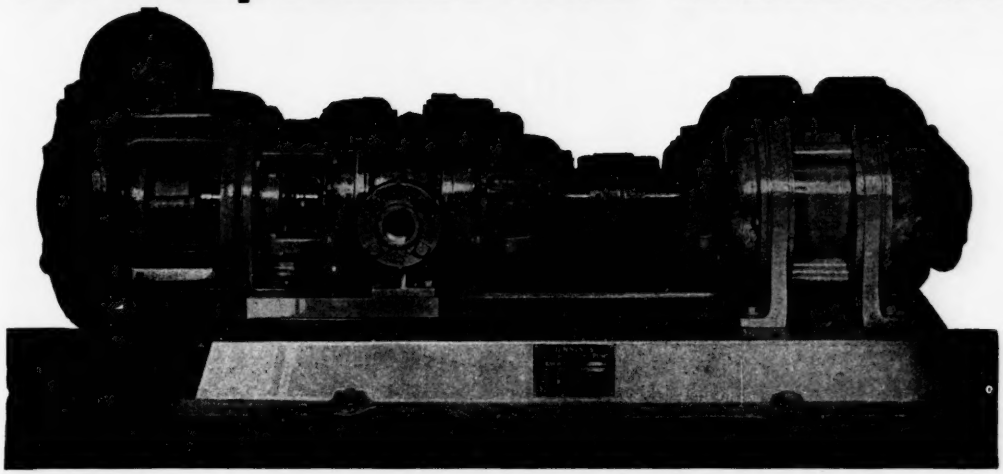

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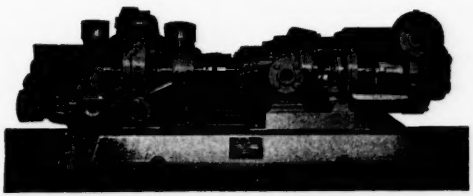

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Convention Reports

NCA officers for 1949, from left: Secretary Carlos Campbell, Washington; President John F. McGovern, director, public and industrial relations, Minnesota Valley Canning Co., Le Sueur, Minn.; Treasurer Frank E. Gorrell, Washington; and Vice-President H. P. Taylor, president, Taylor-Caldwell, Inc., Walkerton, Va.

Canners Seek Clearer Pricing

Hope is expressed, at annual meeting, that Congress will act to correct situation

BASE POINT pricing and general merchandising shared the spotlight with processing and distribution problems at the 42nd annual convention of National Canners Association, in Atlantic City, last month. Because the pricing controversy is of such direct concern to practically all food manufacturers, the subject took up most of the first general session, which also featured a talk by Harold E. Stassen, president of the University of Pennsylvania and former governor of Minnesota.

NCA's counsel, H. Thomas Austern, outlined some of the ramifications implied by recent high court decisions on Federal Trade Commission rulings in the Cement, Morton Salt, Corn Products, Crepe Paper, and Rigid Steel Conduit cases.

These decisions, he pointed out, affect the five principal types of selling: Uniform delivered pricing, zone pricing, single basing point, multiple basing point, and freight equalization pricing. All of these are important to the canner, in one way or another. Yet, at present, there is almost no way to determine what is permitted and what is not.

He lauded the Johnson Bill, introduced by Senator Edwin C. Johnson, of Colorado. This bill, he said, will clarify the whole pricing situation and return canners—and all other industrial producers—to a realistic competitive basis.

Scores Bureaucratic Power

Lowell B. Mason, acting FTC chairman, declared that the implications of the five pricing decisions are such as to make FTC the most powerful concentration of bureaucratic control over business in the world. In his opinion, canners should be warned against the bureaucratic tyranny that is developing through assumption of power by the federal departments. He saw a very great need for legislation to clarify the whole anti-trust structure. While not wishing to comment on pending legislation, Commissioner Mason declared that any bill proposed by Senator Johnson deserved careful study. It would be as sound, he said, as integrity, experience and knowledge of the subject could make it.

Both Mr. Lowell and Mr. Austern agreed that corrective legislation will not be accomplished without the all-out backing of business and industry. They both urged the association and its individual members to make their legislative wants known to the members of Congress.

This same theme, broadened to include all forms of excessive governmental controls, was emphasized by Mr. Stassen. He cited the view, now dominant in many parts of the world, which holds that a people's economic freedom may be taken away while they continue to maintain their social, political and religious liberties.

This year, Mr. Stassen looks for economic unrest—possibly even reaching the rioting stage—in countries like Poland, Czechoslovakia, the Ukraine, and Eastern Germany. These people have been told, he said, that under rigid economic control—under their loss of economic freedom—they were going to receive dividends in consumer goods. These dividends have not been forthcoming.

Fishery Expansion

One of the first technical conferences of the meeting was that on fishery products, in which the use of our fishery resources was, in effect, given a thorough overhauling. L. A. Walford, chief, Branch of Fishery Biology, Fish & Wildlife Service, told how scientists are studying food resources of the sea, with the object of getting the most—on the average—that the sea can yield. To this end, the fishery scientists of northern and southern Europe and the Orient have organized with the U. S. group. An initial aim of the group is to study the habits of the herring. Until these studies are developed, he said, the herring will continue to be an undependable, inefficiently utilized source of food.

The desirability of regulating fish catches was discussed by W. B. Chapman, special assistant for fishery and wildlife to the Under Secretary of State. He held that each fishery should be allowed to grow until it reaches its most efficient point. Then it should be held to that production. Until the nations concerned will cooperate on international regulations, however, this ideal cannot be realized.

Advanced Processing

The cannery problems conference produced discussions regarding retort operations, methods used to produce vacuum in cans, process determination in agitating pressure cookers, nutrient retention in canning, and use of stainless steel and chrome plating.

A series of checks in the form of questions were put to both cannery management and retort operators by D. V. Alstrand and R. Royce, Continental Can Co.

Cannery managements were asked:

Are your retorts properly designed, equipped, and installed? Are your products procesed without delay after closing? Are your retorts properly vented and bled? Are you sure your retort temperature and pressure gages are accurate? Are you using recommended process times and temperatures for your products? Is your retort operator competent and trustworthy?

Retort operators were asked:

Are all cans processed promptly, after closing? Are the retorts properly vented during the come-up? Are all bleed pet cocks kept full open during the entire process? Have the thermometers and pressure gages been checked recently? Are the processes accurately timed? Is the correct process being used? Are the processed cans promptly and thoroughly cooled before storage?

Three methods of achieving vacuum in cans were discussed by G. T. Peterson, Continental Can Co—preheating products before closure; mechanical vacuum closing, and "steam-vac" closure.

Preheating, he said, is generally applicable with liquid and semi-liquid products which can be easily heated. Preheating is done before, after, or before and after the products are filled into cans.

Mechanical vacuum closing can be applied to solid products like meat, fish and vacuum packed vegetables. And "steam-vac" closure is generally used for products packed in brine or sirup. This latter method involves the injection of live steam into the headspace of the filled container immediately before closing. Products containing occluded gases must have these gases removed by preheating.

Proper use of the continuous agitator pressure cooker results in unsurpassed quality in canned foods, according to P. C. Wilbur, Food Manufacturing Corp., because higher temperatures can be used in shorter processing time. Agitation achieves an increase in the heat penetration and provides a more uniform heat throughout the product. The method also eliminates blow-up and come-down time in conventional type batch retorts.

In this connection, E. J. Cameron, N.C.A., R. W. Pilcher, American Can Co., and L. C. Clifcorn, Continental Can Co., reported a 20 percent higher retention of nutrients in products processed by agitation than was found in the conventional batch retort method.

Prevention of equipment corrosion and protection of food quality were principal advantages seen in the use of stainless steel and chrome-plating. R. S. Scull, Burnham & Morrill Co., describe his company's experience in developing a method of chrome-plating contact parts in order to prevent food discoloration.

Insecticide Effects

While a great deal of information on the toxicities of many of the newer organic insecticides was revealed at the joint conference with six experts from USDA and state agricultural experiment stations, it was apparent that insufficient data had been accumulated to make possible the setting of limiting standards based on toxicological considerations.

This lack of standards of tolerance was the source of much concern among canning technologists, who discussed their experience with respect to residues at the same session. Not only were they concerned with the residues in the products to be canned, but with those on the byproducts, which are used as forage for dairy cattle and cattle to be slaughtered. Their consensus was that so little is known about the toxicity of many of the new insecticides, and the products resulting from their breakdown during processing, that products sprayed with them are of questionable quality.

In addition to toxicity, flavor of canned foods seems to be affected by insecticide residues. This was demonstrated in the case of tomato puree, peaches, and corn. While effect on the corn was slight with tomato puree and peaches, flavor scores were considerably reduced by all of the newer insecticides.

Those Grower Contracts

Improved canner-grower relations are necessary if government interference is to be kept at a minimum, in the opinion of H. E. Voorhees, president, New Jersey Farm Bureau. "The present procesor's contract is a stumbling block to negotiations," he said, "and a new contract should be written with both parties participating."

A similar view was expressed by several of the canners' representatives. One suggested that the present contracts "lacking in mutuality, and written for the canner's benefit," be changed in many respects.

Up-to-Minute Equipment

In the equipment show, which represented a roundup of well-engineered new and modern machines and instruments for the industry, the trend to continuous processes and efficient high-capacity units was quite evident. One of the outstanding new developments—so new that it was presented in pictures rather than in the "flesh"—was a vertical retort loader-unloader-agitator. It consists, essentially, of disks mounted on a shaft which extends through the lid of the retort and is rotated by a motor. The disks, a little smaller in diameter than the retort, are spaced widely enough apart so that upright cans can go between them, and are enclosed by a steel-mesh guard. The assembly is raised by a hoist so that the bottom disk is just above the top of the retort. Then the cans are fed onto the disk from a conveyor much as they are onto an unscrambler, the rotation of the disk positioning them until it is filled.

Then the other disks are similarly loaded, the unit lowered, the lid clamped down and retorting started. The disks rotate during the cook, to provide agitation and reduce retorting time. For unloading, the unit is raised so cans discharge from rotating disks onto unloading conveyor.

Aside from speeding the process, the unit is said to reduce manpower 7 to 10 men per line and to increase number of cans to be put into the retort. The unit may be attached to lid of existing vertical retorts.

Another new development, again so new that a preliminary rather than the final model was exhibited, was a continuous corn maturity selector. It is an adaptation of a dry particle classifier which uses air flotation of light particles and movement by vibration and gravity to separate the light from the heavy.

Among the other developments were a metal-diaphragm type of sanitary pneumatic liquid-level meter; a stainless steel probe thermocouple for quickly taking the temperature of batches in open kettles; a thermometer with a flat bulb which fits flush in an opening in the bottom of a kettle so that scraper blades may pass over it; and a bag dumper operated by a hydraulic cylinder which uses city water pressure.

Also shown were a machine for applying thermoplastic labels to one-trip bottles, or other glass containers; a photoelectric machine which sorts green lemons from ripe; air-blast can dryers; a machine which washes foreign matter from retorted cans and then dries them for labeling.

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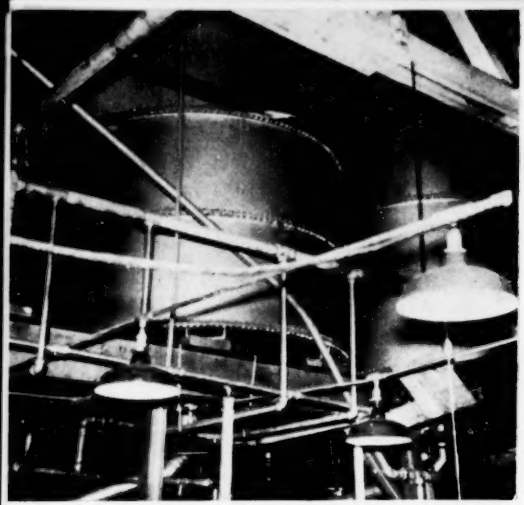
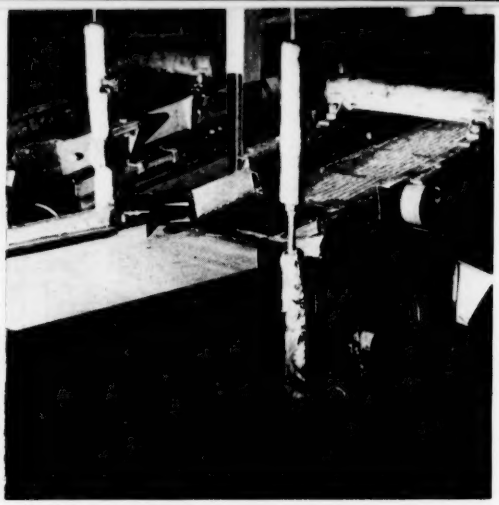


A **DRY** beans are first delivered, via bucket elevator, to these 5,000-gal. soaking tanks.



B **SOAKED** beans flow down flumes for removal of stones, go to vibrating-screen water separators (above).

Baked Bean Processing—In Cans and Glass

This Line Speeds Production, Cuts Breakage, Improves Quality

THE baked bean production line at the J. P. Ritter plant in Bridgeton, N. J., has recently been modernized and the changes have speeded production, reduced breakage, and improved the control of quality.

Dry beans are soaked in glass-lined tanks, from which they flow down a riffle flume, which removes pebbles and other foreign matter. They then pass to a vibrating-screen water separator.

After inspection, beans are next discharged from a conveyor-type water separator into a stream of heated water which carries them through the blancher. The old type scroll-in-tank blancher has been replaced by a 1,100-ft. tube-type blancher with temperature control and fixed travel time. This blancher is suspended from the ceiling, thus reducing floor space requirements.

Water in the system serves as the blanching medium. It is recirculated, except for a small make-up replacing losses. As the hot water conveying the beans enters the stainless-steel blancher, it is heated by live steam injected through a 12-ft. manifold.

The blancher unit empties into a rotary squirrel-cage separator, which removes water and skins from the beans. Skins are later removed from the blanch water in a second, fine-screen rotary separator.

Blanch water from this separator enters the blancher system at a temperature controlled by instrumentation. The blanched, skin-free beans are discharged from the separator to the holding tank feeding the filling machines.

The old laborious hand operation of dropping a piece of pork into each can or glass jar before filling with beans and sauce has now been replaced by a machine-filling operation. Filling of cans or jars with beans and sauce, and closing, are then subsequent machine operations.

Cans or jars from the closing machine were formerly racked into retort crates by hand. Now, a machine-counted number of containers are automatically picked up by electromagnet and deposited in the retort crate. This method has not only reduced labor and cut down breakage, especially of glass, but it has also speeded operations and justified use of a higher-speed glass-jar closing machine.

Retort operations have also been improved to insure greater quality control. Each retort is time-temperature controlled by instrument, thus labor requirements are reduced, human error eliminated, and uniform quality assured.

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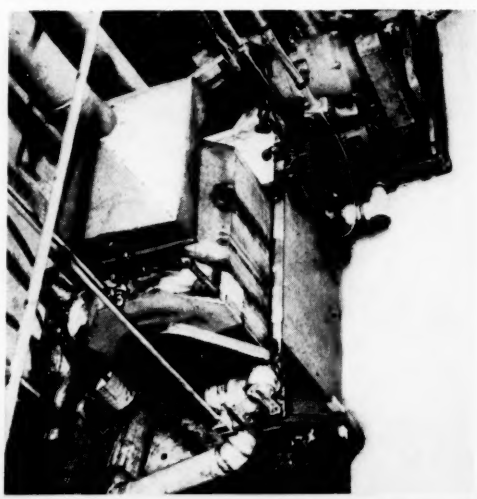
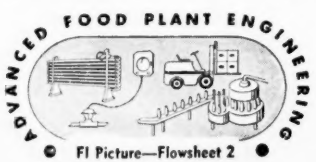
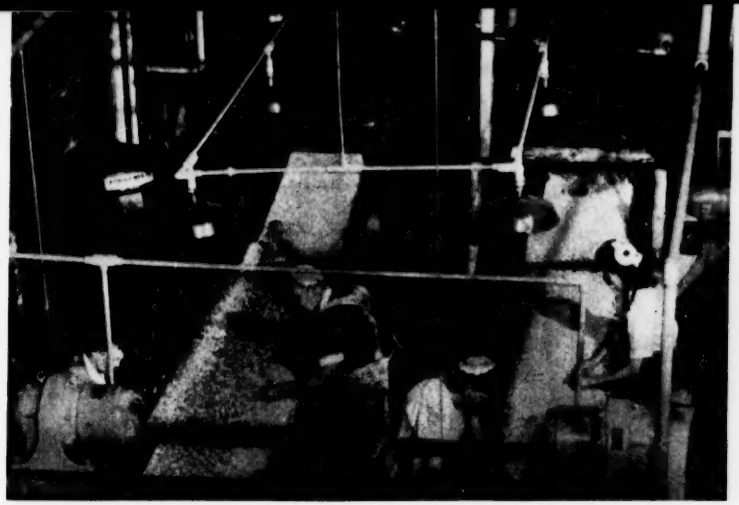
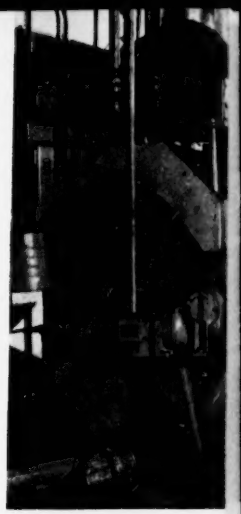
G **SKINS** are separated from blanch water in fine-mesh separator (left center). Blanch water is recirculated.



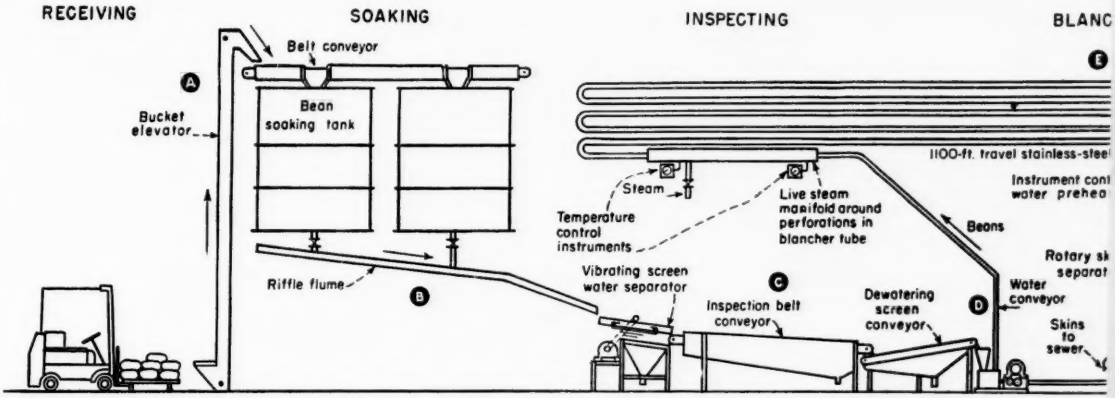




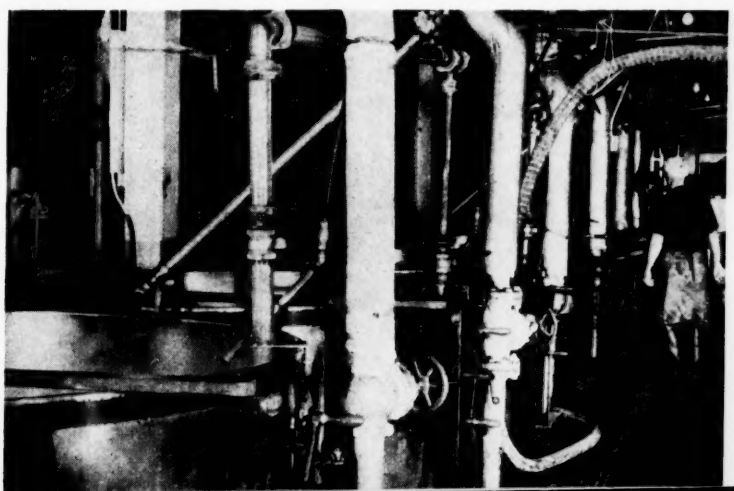
C **DEWATERED** beans are conveyed on an inspection belt. Here, operators stationed along the sides of the belts remove any blemished beans.



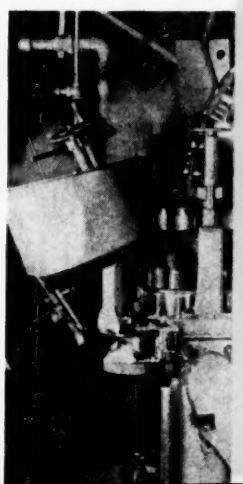
D **INSPECTED** beans a stream of heated wate

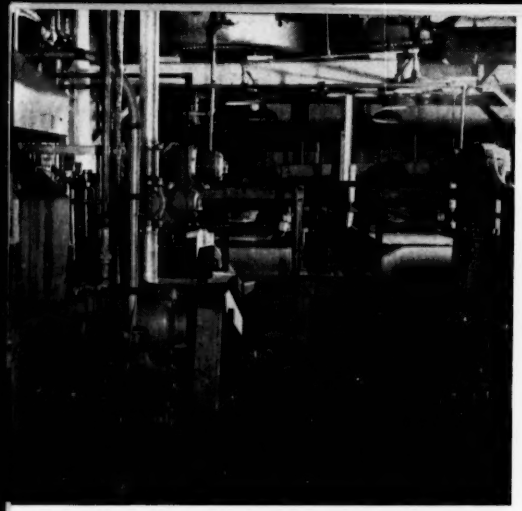


H **SAUCE** for the beans, comprised of onions, condiments, and other ingredients, is prepared in stainless-steel kettles. Glass piping is used in this operation.

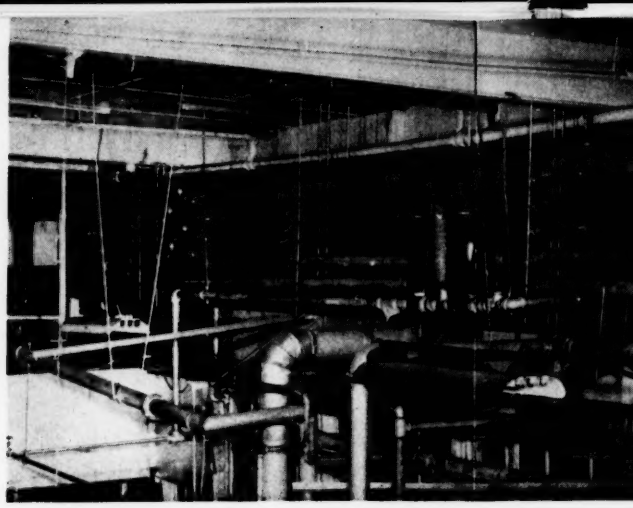


I **LINES** of sauce, beans, Filling and sealing of th



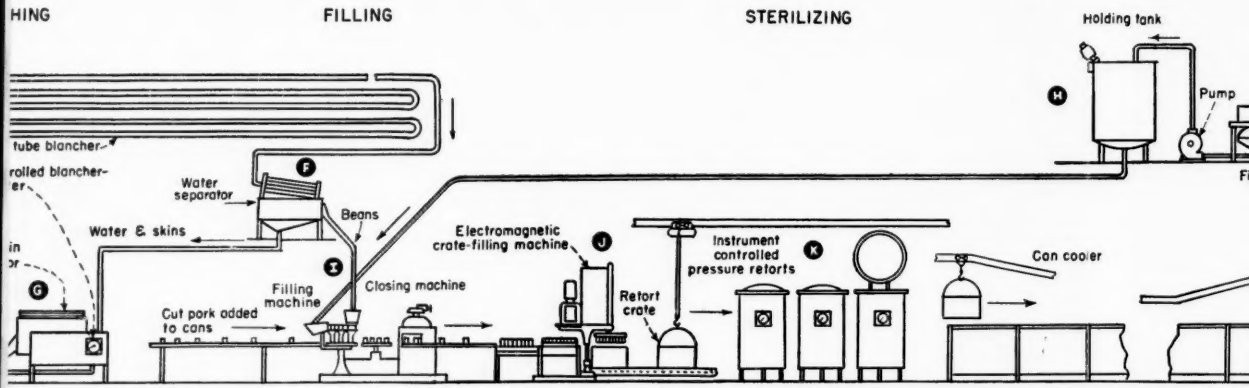


re discharged from a conveyor-type water separator into a
r and pumped (center above) to the tube blancher.

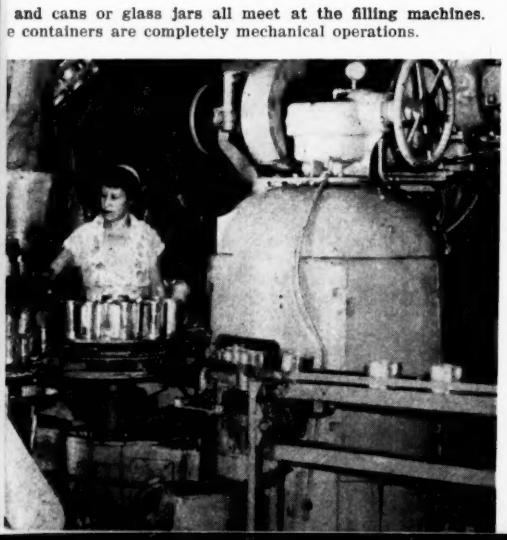


E **BEANS** travel 1,100 ft. through the 4-in.-dia. stainless-steel tube blanche
water gets live-steam injections. Water circulation is controlled.

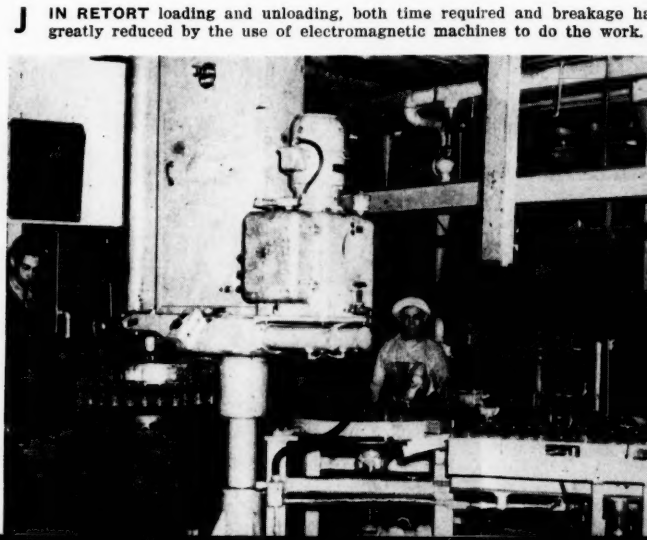
HING FILLING STERILIZING



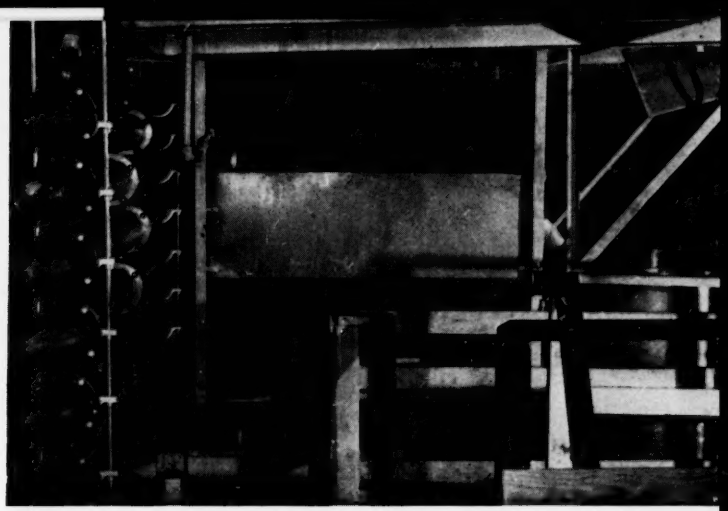
and cans or glass jars all meet at the filling machines.
e containers are completely mechanical operations.



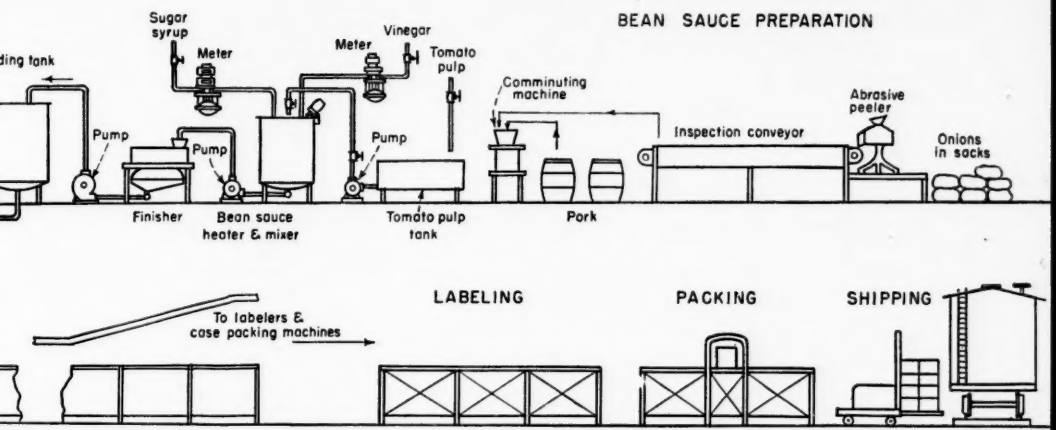
J **IN RETORT** loading and unloading, both time required and breakage ha
greatly reduced by the use of electromagnetic machines to do the work.



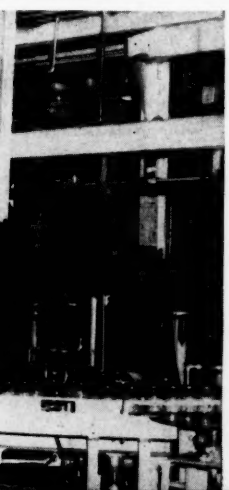
steel tube blancher. Blanch
s controlled.



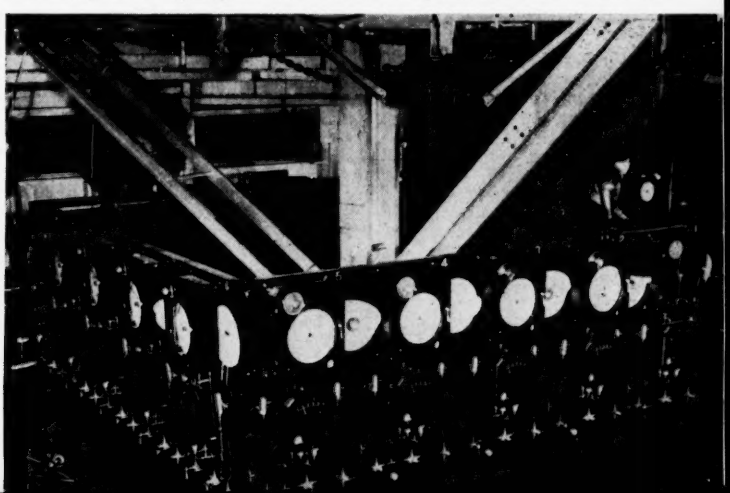
F WATER and skins are separated from beans in a rotary squirrel-cage separator. Beans are discharged into holding tanks supplying the filling machines.



and breakage have been
to do the work.



K TIME and temperature in retorts are controlled automatically. Improved, consistently uniform quality is obtained with these precision-control instruments.



Variety of Operations at

BERG BRETZEL COMPANY

Emphasize Versatility of GAS

In every branch of the food industry GAS is the accepted fuel for heat-processing applications—chosen by production-minded executives for its versatility, cleanliness, economy.

Typical of the installations in which GAS serves a variety of needs is the Berg Bretzel Company, division of Dan-Dee Pretzel and Potato Chip Co., Leetonia, Ohio. This pioneer manufacturer of pretzels also produces potato chips, twisted corn meal strips, and julienne shoestring potatoes. In the Berg plant modern Gas Equipment is used for frying, baking, batch-melting, and water-heating.

In deep-fat frying alone each product requires a different temperature which automatically-controlled GAS maintains accurately throughout the cooking cycle. Pretzel baking, in the Berg plant, is completely automatic from start to finish. In this system a continuous Gas Oven, installed in the production-line, performs the heat processing operation. Potato chips are made in an automatic Gas-fired Machine.

Through the application of modern Gas Equipment to its heat processing needs, the Berg Bretzel Company maintains a high production rate in its small, efficient plant. The versatility of GAS is best demonstrated in establishments of this type where the heat-processing requirements are as varied as the types of products.

But the characteristics of GAS are such that it can be applied in any food industry requiring heat for processing. It's always worthwhile to check up on the latest developments in Gas Equipment for the food industry.

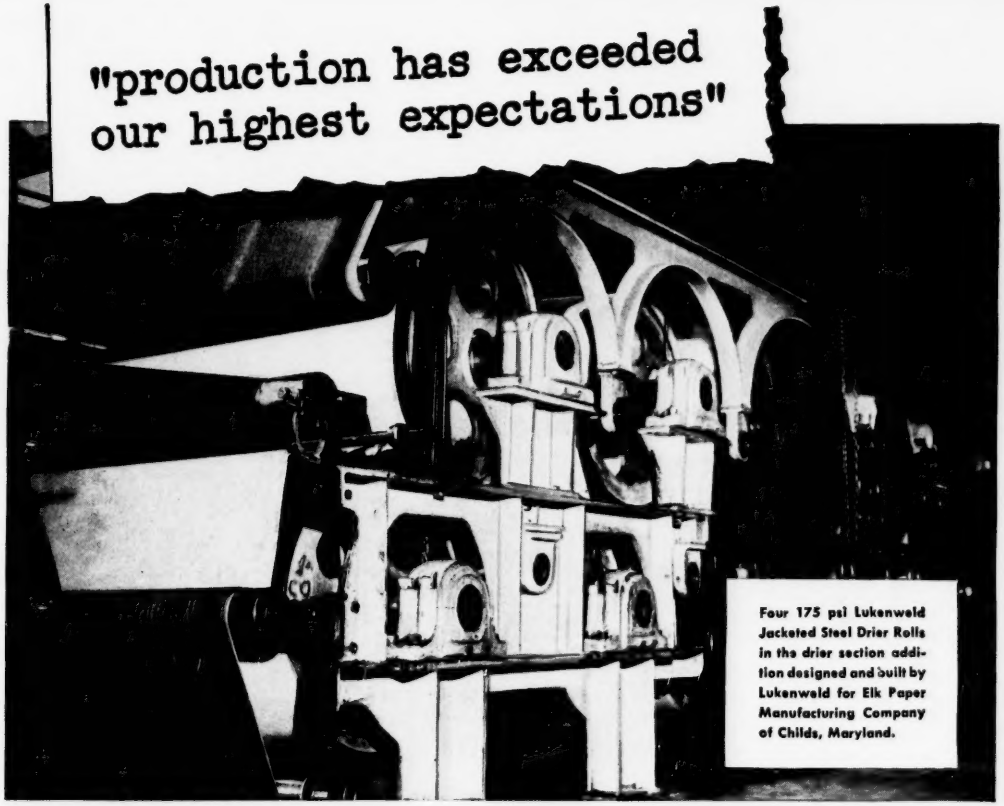
Gas-fired deep-fat fryer in which corn meal strips are cooked.

Plant Manager Ralph Kennedy checks on pretzels leaving the automatic Gas Cooker and entering the Gas Oven.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE NEW YORK 17, N. Y.

"production has exceeded our highest expectations"



Four 175 psi Lukenweld Jacketed Steel Drier Rolls in the drier section addition designed and built by Lukenweld for Elk Paper Manufacturing Company of Childs, Maryland.

...with this Lukenweld drier section addition

Co-operation between operating men with drying problems and Lukenweld engineers brings in frequent reports like this one from Elk Paper—increased output, higher quality production, safer operation.

As designers and manufacturers of complete drying machinery, we at Lukenweld are well acquainted with drying operations in many industries. We'll take your ideas and put them to work—first a design on paper, then a pilot model if desirable, a finished machine or structure, and its installation. Lukenweld service is that complete.

If the job calls for Drier Rolls... Hundreds of Lukenweld Jacketed Steel Drier Rolls, in service today in the paper, chemical, drug, food, plastic and other industries, are proving they'll do the job faster, better and safer. *Faster* because of reduced wall thickness and positive scavenging of entrapped air, condensate and film from steam passages, assuring higher efficiency. *Better* because surface temperatures are even and constant. *Safer* because of their high-strength, steel plate construction.

For drying help, or for Bulletin 358 telling about Lukenweld Drier Rolls, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

We'll lend you "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

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DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

"It Takes the Cake for Bakery Goods"

THAT'S right. Bakery products, too, are now enjoying the perfect quality-protection, the extra sales-appeal that go with **Pliofilm** packaging.

In **Pliofilm,** Stollen, brownies, filled cookies, crackers, keep fresh and crisp till they're eaten. Cream-filled cookies hold the moisture content upon which their goodness depends.

The reason: **Pliofilm** is air-moisture-liquid-proof. It keeps wanted moisture *in*, unwanted moisture *out*. It's this property that makes it the ideal packaging for any food whose quality is affected by moisture absorption or evaporation.

If you've a moisture problem in packaging, get acquainted with this miracle transparent film that insures customer satisfaction. For additional details, write: Goodyear, Chemical Products Division, Pliofilm Dept., Akron 16, Ohio.

Everything is better in Pliofilm

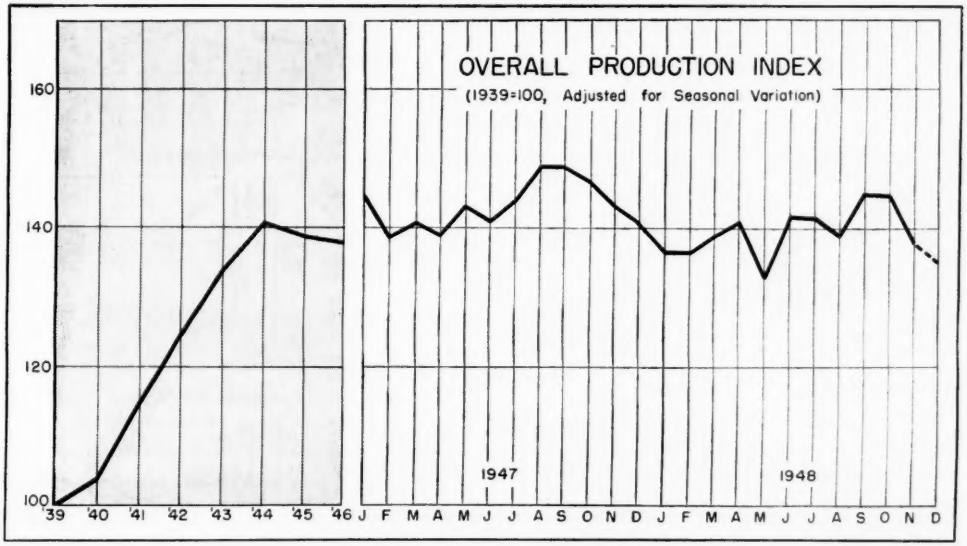
3-way protection against air, moisture, liquids

GOODYEAR

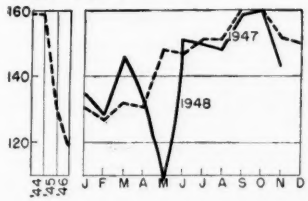
THE GREATEST NAME IN RUBBER

Pliofilm —T.M. The Goodyear Tire & Rubber Company

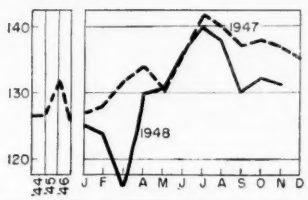
Food Industries Index


OVERALL PRODUCTION INDEX
(1939=100, Adjusted for Seasonal Variation)
160
140
120
100
'39 '40 '41 '42 '43 '44 '45 '46
J F M A M J J A S O N D J F M A M J J A S O N D
1947
1948

Meat Output Plummets



Flour Downgrades



At a Glance—

(1939 = 100, With All Figures Adjusted for Seasonal Variations)

	Nov. 1948	Month Ago	Percent Change	Year Ago
Baking	140	144	−3	135
Beverages	153	161	−5	146
Butter	65	75	−13	69
Canning	136	143	−5	138
Cereals	141	144	−2	151
Condensed Milk	176	174	+1	173
Confectionery	147	148	−1	157
Flour	131	132	−1	137
Ice Cream	161	161	—	185
Malt Liquors	153	151	+1	171
Margarine	237	274	−14	317
Meat Packing	143	160	−11	152
Sugar, Beet	109	111	−2	92
Sugar, Cane	69	72	−4	107

Drop Continues in Overall Food Production; Status of Meat and Flour Examined

Latest index reading (preliminary) and comparative previous-month figure (revised) are now shown each month in the new "spot" indicator on FOOD INDUSTRIES' *cover.*

THE INDEX of processed food production continued to decline in December. The preliminary figure for the month is 135, with the final figure for November computed as 138.

Meat production, in particular, dropped sharply in November. But although output has been below that of last winter, meat prices have been falling. In the first week of the new year, heavy marketings caused hog prices to drop to the lowest levels since October 1946 and steers to return to April 1948 levels. And lard and tallow hit their lowest quotations since the end of OPA.

These declines took place in spite of the fact that consumer income has been running 5 percent above a year ago.

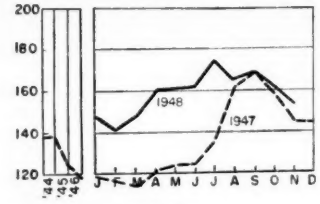
As FOOD INDUSTRIES has repeatedly pointed out, meat production probably will not greatly exceed last year until the fall months. A seasonal drop is now beginning. In the first quarter of 1949, supplies are expected to be lower than in 1948. Improvement will begin in April or May, when the fall pig crop (up about 8 percent) comes to market. And in the third quarter of this year, slaughter of both hogs and grain-fed cattle should be well ahead of last. But not until the final months, when the 1949 spring pig crop is ready, does meat promise to be really plentiful.

Meat prices, however, may continue to slide. Consumers evidently still have enough money to pay premium prices. But in recent months they have been inclined to save instead. This tendency to spend more cautiously has been noticeable in all lines of retail trade. And the result has been price weakness where supplies are expected to increase.

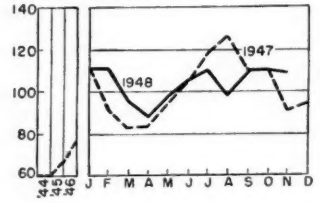
Flour is another case where production is running below a year ago. Yet flour prices, too, have dropped, and they are headed still lower. The principal factor, in this case, is declining export demand. Better crops in Europe this fall have permitted the Marshall Plan countries to supply a bigger share of their own needs. And in the coming year, chances are that even less American flour will be sent abroad.

Total bread grain shipments requested as part of the next year's

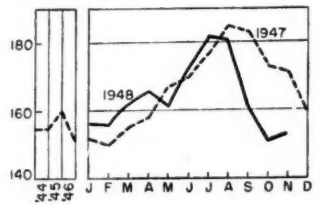
Beverages Drop Again



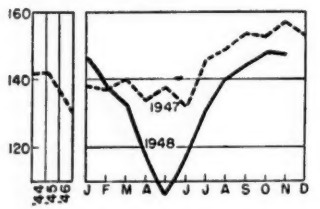
Beet Sugar Slightly Off



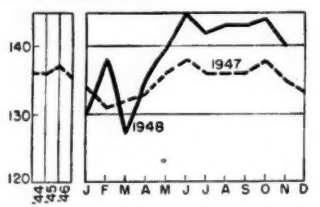
Malt Drinks Up a Bit



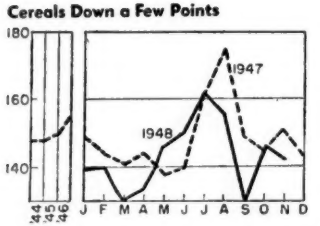
Confections Level Out



Baked Goods Lower



Cereals Down a Few Points



ECA program are only slightly less. But ECA will probably seek permission from Congress to send all the grain in the form of wheat, which is cheaper to ship. Up to now, 25 percent of all wheat shipped has gone as flour.

General Outlook Still Strong

All signs still point to strong demand for most food products well into 1949. The outlook for good general business is bolstered by the McGraw-Hill survey of capital expenditures for 1949, which indicates that business plans to continue a high rate of spending on new plants and equipment. The accumulation of such projects seems to keep our heavy industries going full blast for some months to come and provide steady employment for industrial workers. Consumer expenditures for food have never shown a sharp decline while wage earners were bringing home high paychecks.

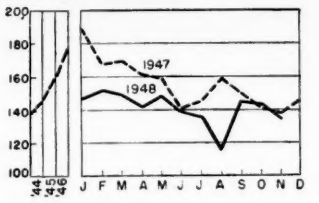
But the higher priced foods may have to come down some in price if shoppers continue their present tendency to hunt for bargains. Retail food chains have already made numerous cuts in order to keep up unit volume.

The dollar volume of food purchases later in the year will be considerably influenced by what action Congress takes on new taxes proposed by the President. If the proposed step-up in social security is voted, increased payroll taxes to support the program will go into effect, probably about July 1. The reduction in workers' take-home pay which would result has been estimated at about $2,500,000,000 per year. This is a small amount relative to total consumer income. But it would be a tax soak-up of extra dollars which might otherwise be spent on food or other goods.

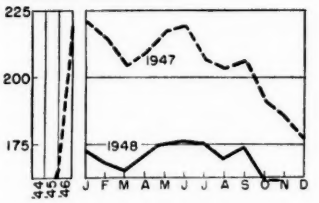
Higher taxes on personal incomes and on corporations have also been proposed. These would amount to an additional $4,000,000,000. Taking this much money out of circulation could have serious repercussions on total consumer expenditures and on retail food sales. Higher personal taxes, chiefly on large incomes, would not cause much cutback in food purchases. But stiffly higher corporate taxes would wipe out much of the funds now counted on to support business expenditures for plant and equipment.

Curtailment of these capital improvement programs would mean less business in all the heavy industries. This, in turn, could lead to layoffs and lower payrolls for the one third of industrial workers engaged in production of capital goods. Congress may well balk at such a tax program. But its introduction has clouded the sales outlook for the latter part of 1949.

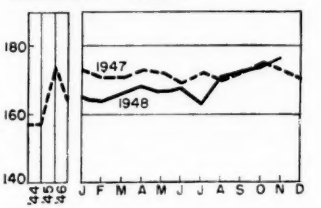
Canning Line Descends



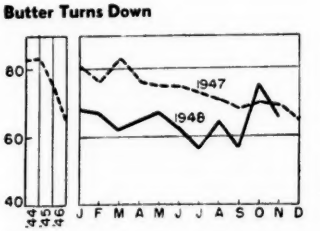
Ice Cream Holds Even



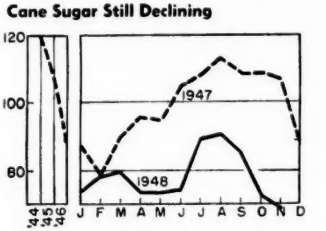
Condensed Milk Higher



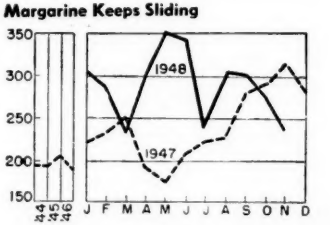
Butter Turns Down



Cane Sugar Still Declining



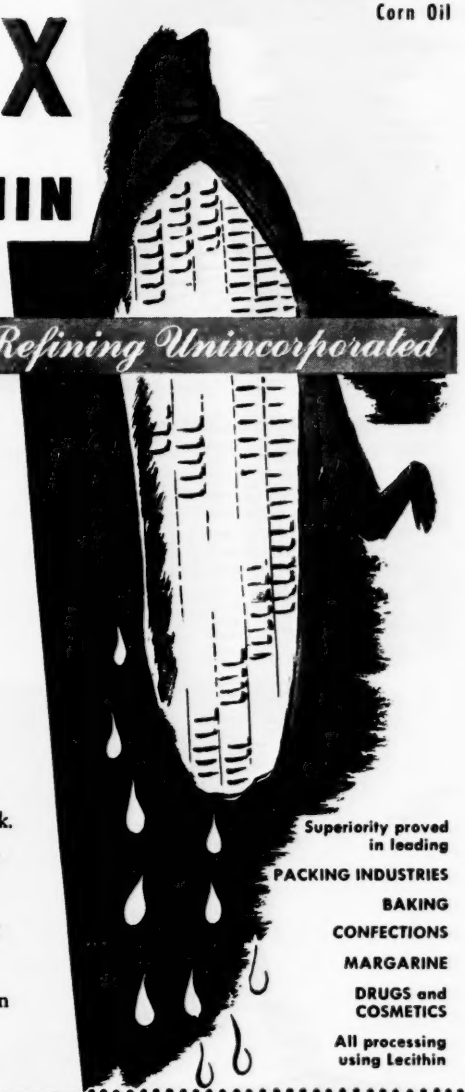
Margarine Keeps Sliding



Golden brown, free-flowing

Demonstrated!
The Unsurpassed Lecithin derived from Pure Corn Oil

VODOL-XX is the CORN-OIL LECITHIN



Exclusive product of

Refining Unincorporated

That VODOL-XX has no peer as stabilizer and anti-oxidant is conclusively demonstrated in continuing reports of its use in representative food industries. It has developed exclusive qualities for production and preservation.

Ease of manipulating VODOL-XX helps to cut production costs. Your stabilization factors are assured. Reversion troubles are reduced to a minimum.

See for Yourself!

Try VODOL-XX in your own plant at our risk. Use coupon below for enough VODOL-XX for your plant test, without charge or obligation. Instantly soluble at low temperatures. Does not require pre-heating, pre-dissolving, straining nor thinning. Unexcelled in ready dispersion of fats. Effects long shelf-life and freshness.

Superiority proved in leading

PACKING INDUSTRIES
BAKING
CONFECTIONS
MARGARINE
DRUGS and COSMETICS

All processing using Lecithin

send coupon now!

FI249

Refining Unincorporated,
407 S. Dearborn St., Chicago 5, Ill.

Without obligation, I'll be glad to give VODOL-XX a trial in our plant.

NAME_____

POSITION IN FIRM_____

FIRM NAME_____

ADDRESS_____

New Packages and Products

Prepackaged "Dutch" Dinner

One of the newest ideas in the food prepackaging field is the use of a strong, transparent and moisture-proof Pliofilm pouch for the merchandising of kraut and weiners in a single package. The film holds the full flavor freshness of the contents and makes a striking visual container.

The novel pack contains 1 lb. of the kraut and either four or six franks. It was introduced by the Mane Sausage & Provision Co. of Cincinnati, after extensive investigations in conjunction with the experimental laboratory of Goodyear Tire & Rubber Co.—producer of Pliofilm.

Transparent "Cans" Developed for Dried Foods

Attractive possibilities for visual merchandising of dried foods is offered with the use of transparent containers made from extruded plastic sheets sealed with tin lids.

The material employed, tradenamed Tenite, is tough, flexible, does not tear easily, and has sufficient rigidity for a straight-sided, neat-looking package.

In experimental developments, products like candy, nuts, coffee, tea, spices, seeds and tobacco have been satisfactorily packaged. Liquid foods, however, cannot be used in the container since Tenite (cellulose acetate butyrate) permits the passage of water vapor.

To form the can, a blank of the plastic sheeting is cemented on a mandrel—or it may be bonded electronically—into the shape of a cylinder. Can lids are applied in a power sealing machine such as is used in standard canning operations.

An appropriate label can be printed directly on the plastic sheet, before the cylinder is fabricated. Lithography, decalcomania, or the silk screen process may be used.

Further information about the use of the material and necessary equipment can be obtained from the Tennessee Eastman Corp., Kingsport, Tenn.

Canned Meats in New Promotional Display

Novel multi-item packages of varying assortments of tinned ham, bacon, frankfurters, sausages and jars of instant coffee were recently introduced in Eastern and mid-Western markets by the Hygrade Food Products Corp. of New York City.

The new assortment containers, termed a departure in merchandising, are being initially promoted with stress upon their suitability for year-round gift giving.

The cartons have a basic, gay, color scheme of red, blue and yellow, with striking cartoons around the sides. Top flap of the box carries illustrations of the individual cans.

Portable Pantry carries out its name by offering an assortment including an 8 oz. can of pork sausages, a 1 lb. 8 oz. can of cooked ham, an 8 oz. can of frankfurters, a 12 oz. can of sliced bacon, and a 2 oz. jar of instant coffee.

Breakfasteer contains a 12 oz. can of bacon, an 8 oz. can of sausage, and a 2 oz. jar of instant coffee. A third package, the Piggy Bank, has three 12 oz. cans of sliced bacon.

The Zan Diamond Co., New York City, designed the boxes, which are supplied by United Board & Carton Co.

(Continued)

WHICH CAP HELPS SALES?

BEFORE

AFTER

WHEN COMPETITION IS KEEN, good packaging will sell more goods. Good cap design is a vital part of good packaging. This "before and after" illustration shows you how Armstrong's expert package designers can weave an interesting picture, a trade name, and the product name into a colorful, eye-appealing design. Such a design will not only attract more shoppers but will also serve to remind the consumer of the high quality of the product every time the package is used in the home. If you'd like to see how Armstrong's designers could add sales appeal to your metal cap . . . at a fraction of a cent each . . . send sample package and complete market data to Armstrong Cork Co., Glass and Closure Division, 4202 Prince Street, Lancaster, Penna.

Armstrong's Closures

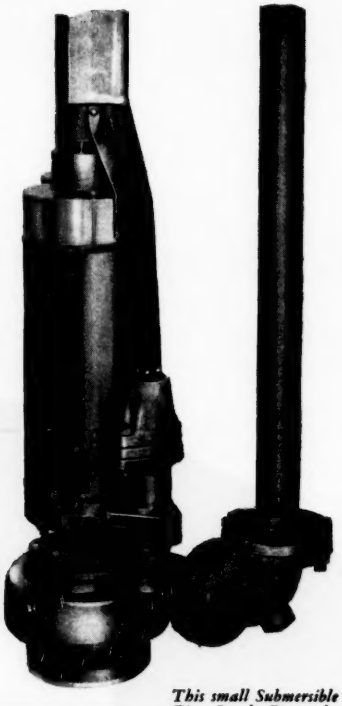
TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

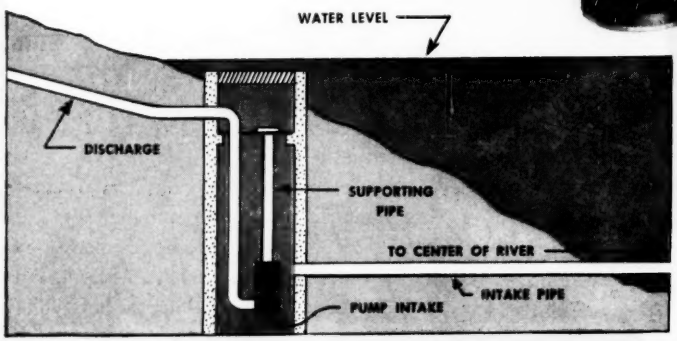
WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12

Pumping from lake or river?
. . . with icing in winter?
and high water in the spring?

get *Under* the trouble with a **BJ**

SUBMERSIBLE RIVER INTAKE PUMP





This small Submersible River Intake Pump delivers river water at 100 gpm against a 55 ft. head. Consistent water delivery in spite of 40° below zero North Dakota Winter temperatures and Spring high water 45 feet above the pump intake.

CAPACITIES: to 5000 gpm
MOTOR SIZES: 7½ to 350 hp
INSTALLATION: Vertical, Horizontal, or on an incline

Down at the bottom of the river or lake it doesn't matter about ice or high water. That's why the Submersible is the logical solution to this kind of pumping problem. It operates regardless of surface conditions.

Sealed oil-filled submerged motor is close-coupled direct to pump (pump can be any one of several different types).

Starting panel (equipped for manual or automatic starting) can be located at any convenient point above flood stage. Discharge pipe should be buried enough to eliminate freezing.

Many other advantages. Easy to install. Simplified intake structure. No adjustments. No pump house. Operates for months without attention. Safe against vandalism.

Byron Jackson Co.
Established 1872
LOS ANGELES 54, CALIFORNIA
Offices in Principal Cities

Old and New Packages

The former half-pound cardboard box (at left in photo) for Chox instant hot chocolate produced by Beatrice Foods Co., Chicago, has now been replaced by an attractive, newly-designed rounded metal can (right) with a snap-down lid. And the old individual-portion envelope (left), weighing 1¼ oz. has now been dropped in favor of a new envelope (right) weighing 1⅛ oz. Both packages display new labels featuring the trade-name.

Containers and labels were designed by Harper Richards of Chicago as part of a program covering the complete redesign of the manufacturer's items, formerly known as Meadow Gold products.

Chox is a powder made from whole milk, chocolate, cocoa and sugar. The product is first made in liquid form and then spray dried. The user makes hot chocolate instantly by the addition of hot water to the powder.

Fancy Assorted Chocolates

A new package containing 43 foil-wrapped molded chocolate pieces in an assortment of three flavors was recently introduced by the Wilbur-Suchard Chocolate Co. of Lititz, Pa.

The manufacturer developed the attractive box, with its quality contents, in answer to the demands of department stores and drug chains. The assortment includes milk chocolate, bitter sweet chocolate, and milk chocolate with almonds.

Embossed gold foil with a contrasting mandarin red band covers the package. Simplex Box Co., Lancaster, Pa., supplies the boxes, and Reynolds Metals Co. produces the foil.

Cookie Mix With Cashew Nuts

A new canned cookie preparation, Holiday Brownie Mix with cashew nuts, has been introduced by Allied Food Industries, Perth Amboy, N. J., as a companion product to the company's Holiday Macaroon Mix.

The new product, states the maker, requires only the addition of one egg and two teaspoons of water, then baking for 35 min., to produce 21 large-size cookies.

The can, which weighs 13 oz., is marketed in three colors: Van Dyke brown, ochre yellow and aquamarine. The label, designed by Byrne, Harrington & Roberts, of New York City, carries an appetite-appealing photo of actual brown cookies.

Consumer tests in key cities on the East Coast have proved successful.

(Continued)

CASE HISTORY NO. 1

The ..... Co.,

National Distributors of imported food products, desired consumer packaging for one of their bulk imports.

Plant conditions had to meet most stringent standards for cleanliness and supervision:

The product required humidity control for proper handling.

Edlaw was contacted—a trial run was arranged—and a permanent line has been in production for the past year.

Customer has renewed contract for the year 1949.

FOR CONTRACT PACKAGING AT PREDETERMINED COST

Pin this to your letterhead

THE EDLAW CO.
88-61 76th Ave. Glendale 27, N. Y.
Kindly contact our
Mr. .....
.....
.....

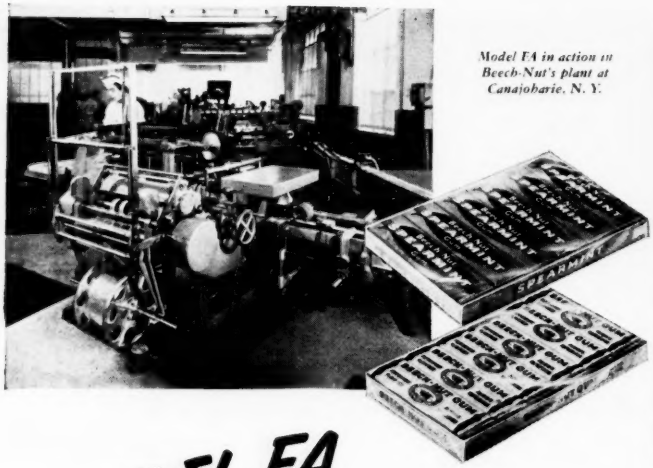
SMOOTH SALE-ING with BROWN PACKETS

Your dry food product, when packeted in Brown open-end envelopes in small ounce quantities, is dressed for smooth "sale-ing". Your design, trade-mark and directions for use are reproduced with the same care you demand of your regular size packages, with each packet printed, cut, folded and sealed to give maximum display value and protection to the contents.

Send for a complete range of samples plus the story of how Brown Packets have made history for leading food processors.

BROWN
BAG FILLING MACHINE CO., INC.
Fitchburg, Mass.

West Coast Reps., Peter D. Bowley & Assoc., 210 Mississippi St., San Francisco, Calif.



Model FA in action in Beech-Nut's plant at Canajoharie, N. Y.

MODEL FA
is Beech-Nut's choice for better display!

Beech-Nut's new multiple-unit wrap is a real eye-catcher . . . one that's selling a lot of chewing gum! Six packs of gum in a tray are over-wrapped with sparkling cellophane. Result—a trim, tightly-sealed package which permits mass display and insures a crisp, fresh appearance at all times.

Since volume production at low cost is a must in this type of operation, our popular Model FA is a natural for the job. However, flawless wrapping of 100 packages per minute, with a single attendant, is but one of the reasons why the FA has become the most widely-used of all wrapping machines.

Other features include quick, easy adjustability for numerous package sizes. . . . Adaptability for various wrapping materials and many styles of wrapping. . . . Electric eye registration of printed designs. . . . And smooth, quiet, trouble-free operation.

Perhaps the Model FA is the answer to one of your wrapping problems, too. Why not get the complete details on this versatile, modern machine? Write or phone us today.

MAKERS OF THE MOST WIDELY USED WRAPPING MACHINES

PACKAGE MACHINERY COMPANY

SPRINGFIELD 7, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND
ATLANTA DENVER LOS ANGELES SAN FRANCISCO
SEATTLE TORONTO MEXICO D.F.

Quaint, Prize-Winning Wrapper

An unusually colorful and picturesque wrapper is now being used on the Pennsylvania Dutch Loaf of bread made by Capital Bakers, of Harrisburg, Pa. Since the firm is an old established family concern of that area, the new covering is exceptionally appropriate and topical.

The package design features the quaint figures of a Mennonite man, woman and child working at various farm chores so typical of the "Dutch" region in which the bread is sold. Executed in brilliant red, white and green colors against a gay floral background, the figures have interesting eye appeal.

The art department of Gray & Rogers Advertising Agency of Philadelphia developed the wrapper, which was given a "best-in-class" award at the recent 14th annual exhibit of the Philadelphia Art Directors Club.

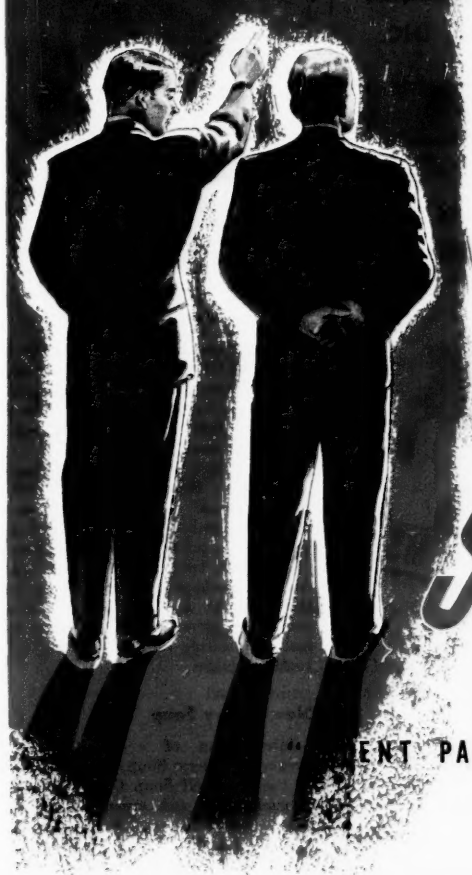
Capital distributes its products in Maryland, Delaware and New Jersey, as well as in its home state.

Savory International Soups

A new line of soups, made according to unusual foreign recipes, are being packed by the Twin Gabel Foods, Inc., of Brooklyn, N. Y. These exotic preparations are the outcome of Zachary Gabel's 20 years of world traveling and his collection of soup

(Continued)

PEPPERCREAM



Peppercream . . . is the *100% flavor extraction of black pepper* . . . yet is as *colorless as white pepper!* Invisibly but unfailingly, it imparts a full, true and uniform flavor to your food product. Peppercream . . . *is* pepper . . . not a synthetic, imitation or substitute. Incorporated in a *soluble* salt or sugar carrier which replaces the fibrous, inert, insoluble carrier of the crude pepper. In 1947 alone, Peppercream seasoned over *600 million pounds* of America's finest food products such as:

- Canned Meats
- Prepared Foods
- Chili Sauce, Catsup
- Mayonnaise
- Meat Products
- Salad Dressing

Always uniform in *flavor,* Peppercream means economy *plus* the benefit of an improved food product. Of supreme quality, but reasonably priced, Peppercream offers you the answer to your pepper problems . . . either individually or as a foundation for your spicing formula.

SEND FOR FREE SAMPLE TODAY . . . let Stange help you make your product stand out — in taste — in sales!

WM. J. STANGE CO., CHICAGO 12, ILL.
Dept. FI

Stange
RHYMES WITH TANGY

CREAM OF SPICE
Seasonings

". . . ENT PARTNERS IN FAMOUS FOODS"

it's NEW... it's DIFFERENT...

IT'S Pakwure FOOD PACKAGINGS GLASSINE,

Embossed Exclusively for Confectioners

and now, Twitchell introduces an entirely new Embossed Glassine for Confectioners only.

It's specially-treated . . . grease-proof . . . embossed with a special design . . . available from stock in two different weights . . . sold only by Twitchell.

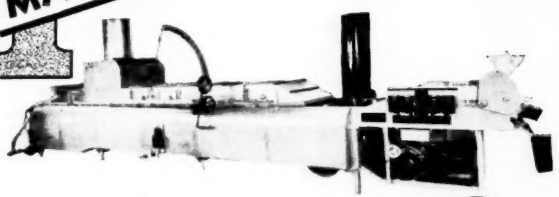
Let us send you samples and prices.

A complete line of wrappings, bags, envelopes and boxes, etc., for all food packaging including candy and frozen foods. Stock or original packagings designed by specialists for sure protection and "eye appeal."

PACKAGING DIVISION, E. W. TWITCHELL, INC.
2817 North Third Street, Philadelphia 33, Pa.

1 MACHINE

☆ POTATO CHIPS
☆ AND JULIENNES



FERRY'S c-o-n-t-i-n-u-o-u-s automatic equipment - with its advance engineering, offers you this AMAZING machine that produces potato chips or juliennes with an interchangeable unit. Low cost, high efficiency. We will be glad to send you additional information and specifications.

2 PROFIT ITEMS

ferry

J.D.FERRY COMPANY,INC.
FOOD PROCESSING MACHINERY

recipes in many out-of-the-way places.

Eight different kinds of soups will presently be in production: Danish Gule Arter, Aztec Bean, Arabian Chervah, Odessa Cucumber, Singapore Mulligatawney, Bavarian Mushroom Barley, Genoese Minestrone, and Basque Onion.

Gule Arter, a Danish term for yellow peas, is a combination of pea and vegetable soup seasoned smokily in the Norse manner. Aztec Bean was discovered in a Mexican peon's hut and contains kidney beans, salt pork, celery, tomato puree, onions, dry chili pods, fine herbs, and spices.

New Pork Product

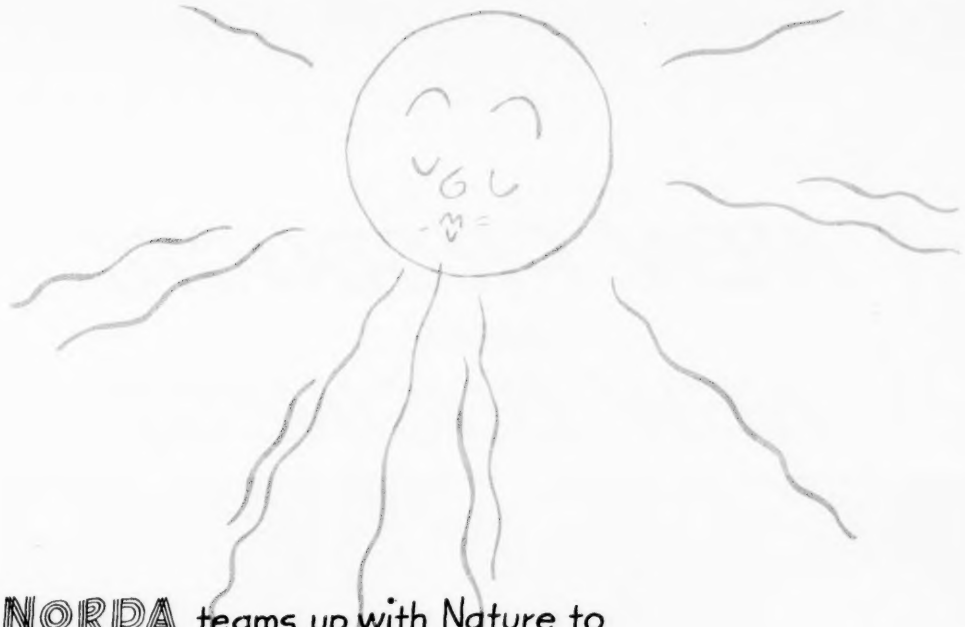
A combination of coarsely-ground lean pork trimmings cooked with mildly seasoned barbecue sauce make up E-Z-Q Pork product now being distributed nationally by John Morrell & Co., Ottumwa, Iowa.

The product is packed in 11- and 16-oz. cans. Harry Farrell, of Chicago, designed the label, which employs the traditional red and yellow colors characterizing the Morrell line.

More than two years of testing preceded the company's introduction of the meat to selected markets. The sauce was given special attention to make it pleasing to both northern and southern tastes.

New Celery Soup

Introduction of a new product, Cream of Celery Soup, is announced by the Campbell Soup Co. The soup is made from rich cream and fresh celery. Production and distribution of this newest item climaxed extensive laboratory and kitchen testing.



NORDA teams up with Nature to

Make ORANGE LEMON LIME for you...

Test them... Try them ... Taste will tell

Why good things made with NORDA sell

Norda Citrus Oils give your product the natural goodness of juicy, fresh, *real* fruit. These true-flavored Norda Flavors have a hearty, sun-ripened richness it would be hard for you to match.

Use Norda Citrus Oils. Try them out in your hard candies, gelatins, mixes, or any other products that may have offered a problem. Norda Flavors help make them *right*. Your customers will know, and your sales will show, the difference in short order.

Send today for your own Free Samples of Norda Citrus Oils and the new Flavor Catalogue. Write now.

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.

601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

Crown Looks Forward with New Inventions

NEW PRODUCTS MEAN NEW BUSINESS

Whipped Cream under pressure — *Lacquers sprayed direct from can* — *Deodorizers and Insecticides*

CROWN'S AMAZING NEW PROPULSION CAN CREATES NEW PRODUCTS AND PROFITS FOR MANUFACTURERS

To succeed against competition, New Products, New Ideas, New Things to Sell, are vitally important. Above are ways in which some Manufacturers are *keeping in advance of competition* with Crown's new one-piece cone-topped Propulsion Can. Now various Products come out automatically under gas pressure as shown.

So easy to use—just "a touch of the thumb" is enough. Perhaps you already have a Product ideally suited to such a Can, or are considering a New Idea. If so, ask to have a Crown Sales Representative call. And remember that the no-side-seam, no-top-seam Crown Can is ideal for pressure use.

CROWN CAN

One of America's Largest Can Manufacturers

PLANTS AT PHILADELPHIA, BALTIMORE, CHICAGO, ST. LOUIS, HOUSTON, ORLANDO • DIVISION OF THE CROWN CORK & SEAL COMPANY

Food Industry News

Per Capita Food Consumption Shows Gains While Exports Also Rise Over Prewar

American civilians ate 14 percent more food during 1948 than in an average prewar year. They consumed 4½ times as much canned juice, about 30 percent more canned fruit, and 23 percent more canned vegetables than in the 1935-39 period, according to the Bureau of Agricultural Economics.

At the same time, food exports increased 100,000 tons during the 1948 fiscal year to a new record of 19,300,000 tons.

Consumption of canned fruit has increased from 9.3 lb. per capita in 1944 to 19.2 lb. in 1947, with 19.6 lb. estimated for 1948. Canned juices registered 9.9 lb. in 1944, 17.1 lb. in 1947, and an estimated 18.9 lb. in 1948.

Conversely, canned vegetables per capita for 1948 will probably fall 6 percent below 1947 consumption and 17.5 percent below the 1946 peak. But this is still higher than during the prewar period.

The drop in canned vegetable consumption seems to be reflected by the rise in quick frozen vegetable consumption. Nationally, says BAE, frozen food use increased from .8 lb. per person in 1935-39 to 2.9 lb. in 1948.

Dried fruits consumption has declined during the postwar years to about 4.5 lb. per capita, about 22 percent below the prewar average.

Price Trends

Pricewise, BAE reports that canned fruits and vegetables have indicated smaller increases since the prewar period than other important foods. From 1940 to 1948, retail meat prices in the U. S. increased 165 percent; dairy products 103 percent; fresh fruit and vegetables 129 percent; and dried fruit 147 percent. But retail prices of canned fruits and vegetables rose only 71.8 percent.

In 1949, per capita food consumption is expected to parallel that of 1948. Reductions in supplies of beef and veal and somewhat lower marketings of fluid milk and cream are expected to continue in 1949; not until late in '49 will the record 1948 feed crops mean better supplies of pork, chicken and turkey. But bumper 1948 oilseed crops mean plentiful supplies of vegetable oils for salad and cooking use, for margarine and shortening.

For Western frozen fruit and vegetable processors, who pack about half the national supply, 1949 prospects appear good. Packers note that their 1947 improved quality pack of 378,512,000 lb. has moved out satisfactorily. They estimate the 1948 pack will total about 10 percent higher in volume, but anticipate no marketing difficulties in 1949. They say prices are firming, markets increasing, and that the new pack has been gaged to a growing consumer demand. Quality is generally higher, packaging better.

The average American apparently intends to continue to buy the fancier and more expensive items that he has acquired a liking for during these flush postwar years—at least until failing purchasing power applies the curb. And no economist is forecasting drastic failure in 1949.

Canadian Food Companies Busy Building Plants

Surveys at the end of 1948 reveal food plants under construction all over Canada.

Borden Co., Ltd., has a new processed-milk plant going up at Kemptville, Ont.; the same company is currently building a new plant for cream milk powder at Toronto, Ont.

British Columbia Refining Co.'s Canadian Sugar Factories, Ltd., is constructing a $4,000,000 beet sugar plant at Taber, Alta.

Canada & Dominion Sugar, Chatham, Ont., is carrying out electrification of all operations and other improvements, to total about $200,000,000.

Christie, Brown & Co., Ltd., is building a new $1,750,000 plant at Etobicoke township, near Toronto.

Peek, Frean & Co. (London, England) is building a new biscuit plant at East York township, near Toronto.

United Farmers' Co-operative, Ltd., Guelph, Ont., is building a new $200,000 powdered milk plant.

Welch Grape Juice and Ontario Grape Growers' Co-operative, St. Catherines, Ont., are building a new $500,000 grape processing plant.

Plant Expansions

In addition, important plant expansion by Canadian food companies, in the planning stage at the close of 1948, included the following projects:

Carnation Co., Waterloo, Que.: major extension of its evaporated milk plant.

David & Frère, Ltée., Montreal, Que.; $300,000 extension of its biscuit plant.

Walter M. Lowney Co., Ltd., Montreal; new plant for chocolate products and confections.

Visking Corp., Lindsay, Ont.; new $1,000,000 plant for cellulose tubing for meat packing and sausage industries.

(Continued)

Wide World

Smudge Pots Keep Going

With the lowest temperatures in history recorded in many Southern California areas on January 4, fruit growers kept smudge pots working overtime, in many cases as late as 10 a. m. Despite this attention, losses were more than $2,000,000.

Annual Reports Show Drop In Meat Packing Profits

Higher sales and lower earnings were the rule among the meat packers, whose annual reports appeared near the end of the calendar year. Swift & Co. sales for the fiscal year ending October 30 were $2,361,114,041, compared with $2,248,766,634 for 1947. Net earnings for all company operations were $27,889,210, equal; to $4.71 per share, compared with the previous year's earnings of $34,334,977, or $5.80 per share. Earnings on meat operations alone averaged ¼c. per pound.

John Morrell & Co. reached the highest sales total in its history with $296,122,859, on which net earnings were $2,587,741. This compares with total sales of $286,072,041 for the previous year, on which the company showed a net of $2,889,017.

Cudahy dropped slightly in total sales and fell off sharply in net earnings. Sales and other revenues for the year came to $567,877,126, compared with the previous year's total of $572,737,126. Net earnings were $1,012,737, compared with the $7,121,707 earned the year before.

Welch Grape Juice Co. showed an increase both in sales and net earnings for its fiscal year ending August 31. Net sales rose to $20,488,040, compared with the previous year's $16,937,435. Net earnings amounted to $1,209,859, compared with $847,594.

For the nine months ended November 30, Beatrice Foods Co. reported net sales of $148,959,948, as against $138,986,911 for the same period the year earlier. Net profit for the period amounted to $2,306,349, compared with $1,984,056 for the same 1947 period.

End of Federal Oleo Tax Seen as Certainty

Fifty years of special taxes on oleo margarine are to be wiped off the federal statute books this session of the 81st Congress. A number of factors add up to virtual certainty for margarine tax repeal:

1. The return of the pro-vegetable-oil southern Democrats and consumer-minded northern Democrats to positions of power in both Houses of Congress.

2. The intentions of the Administration to hew closely to the Democratic platform—which specifically called for outright repeal of the margarine taxes.

3. The fact that a repeal bill almost—but not quite—got through the Republican 80th Congress, accompanied by more publicity than the subject had received in all the years the taxes have been in force.

Chances for repeal are heightened by the fact that Democratic leaders are going to consider the hearings of the 80th Congress as having covered the ground, and that only routine hearings will be required prior to reporting out a bill.

Rep. Harold D. Cooley (D., N. C.), chairman of the House Agriculture Committee, promised prompt consideration for the bill, which means that a House vote should come early in the session.

On the Senate side, Senator J. W. Fulbright will be available to lead the fight again. The bill will probably go again to the Finance Committee, now headed by Senator Walter F. George (D., Ga.), a strong pro-margarine man. This committee, under Republican leadership, last year approved the repeal bill 12-0.

While a number of margarine bills will be introduced, the bill that will get consideration and approval is the straight repeal bill, which would end the license fees on manufacturers, distributors and retailers, end the ¼c. tax on each pound of uncolored margarine, and the 10c. per pound tax on the colored product.

An amendment to the above provisions, added by the Senate committee last year and accepted by the pro-margarine forces in and out of Congress, requires public eating places to make positive identification of the product if they serve margarine. They would have to post a sign or print a statement on the menu—and also identify each serving. Administration of the law would be given to the Food & Drug Administration.

The dairy interests fighting to retain the taxes on margarine have continued their hunt for a formula that would block the use of the yellow color for margarine. Congressional leaders who fought the margarine bill last year do not see how they are going to be able to block legislation this session.

Figures available as FI went to press indicate that margarine consumption during 1948 will hit about 900,000,000 lb. compared with 532,000,000 in 1946 and 712,000,000 in 1947. Most of this margarine is uncolored.

"Somebody Is Letting a Whole Pea Slip by Occasionally!"

Frozen Food Convention Jointly Sponsored

Unification will be the keynote of the third annual national convention and exposition of the frozen foods industry, to be held March 7 to 10, at the Stevens Hotel, Chicago.

Joint sponsors are the National Association of Frozen Food Packers, National Wholesale Frozen Food Distributors, Inc., National Association of Refrigerated Warehouses, National Preservers Association, National Food Brokers Association, and the Quick Frozen Food Association of Chicago.

Fred J. Becker, president of the packers association, has been named

chairman, and W. L. Pavlovski, president of the Quick Frozen Food Association of Chicago, will officiate as secretary of the joint promotion.

Others serving on the general committee are William M. Walsh, president, National Wholesale Frozen Food Distributors, Inc.; Fred M. Deutsch, Marathon Corp., representing the exhibitors; Edgar M. Burns, president, National Association of Refrigerated Warehouses; T. N. St. Hill, president, National Preservers Association, and Watson Rogers, National Food Brokers Association.

The committee has appointed E. J. White, president, Sacramento Frosted Food Co., Sacramento, Calif., as director of the Chicago assembly.

Only one general session will be conducted this year, according to White. This is set for Tuesday afternoon, March 8. The general meeting, he said, will be limited to "short talks by men in the industry about affairs of the industry."

Group sessions will include the annual meetings of the National Association of Frozen Food Packers, the National Wholesale Frozen Food Distributors, Inc.; and the National Preservers Association.

Packers will be permitted to exhibit for the first time as a group at this year's show. Products to be shown by the packers will include frozen foods, vegetables, frozen fruits, berries, juices, meats, poultry, pre-cooked food and specialties.

Food Industry Executives Are Chosen by NAM

Four executives prominent in the baking and allied food fields have begun their service as 1949 officers and members of the board of directors of the National Association of Manufacturers, following their election at the recent 53rd annual Congress of American Industry, held in New York City, and sponsored by the NAM.

Morris Sayre, president of Corn Products Refining Co. and 1948 president of the NAM, was elected chairman of the board. Elected regional vice-president, representing Minnesota, North Dakota, South Dakota and Wisconsin, was Harry W. Zinsmaster, president, Zinsmaster Bread Co., Duluth, Minn.

Re-elected to serve as an NAM state director was William R. Archer, president, Uncle Johnny Mills, Houston, Tex. Director-At-Large Austin S. Igleheart, president, General Foods Corp., was elected for the two years, 1949 and 1950.

These executives will serve through the coming year.

(Continued)

"the proof of the FLAVOR is in the eating"
Years ago we established the Alva Test Kitchens—completely equipped for processing candies, baked goods, beverages and all food products under actual plant conditions. It is here that all Alva Flavors are tested "in the product."*
In well over 30 years of operation Alva Flavor chemists have formulated and kitchen-tested thousands of flavors developed for all products in which flavor is a factor. Chances are, we have already tackled a flavor problem paralleling yours.
* Another fact indicative of Alva's "complete" job on flavors.
Alva IMITATION MAPLE
has been the choice of many well-known food manufacturers for years. The armed services, too, ordered ALVA MAPLE by the thousands of cases because of its downright goodness. Goodness is the reason . . . a true-to-life maple that in many formulas and processes is superior to the finest natural product.
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against moisture vapor transmission. Guard flavor, freshness and food value.

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through skillful design, intelligent use of color and packaging materials.

CONSISTENT QUALITY
of packages speaks well for your product, permits high speed automatic packaging.

STRONG BRAND IDENTITY
established by coordination of design and printing. Promotes your name.

COMPETITIVE PRICES
of Oneida's bag packages make for lower packaging costs. Unit package costs lowered.

This highly desirable combination of packaging virtues is now being provided for baked goods, meats and sausage, grain and cereal products, nuts, potato chips, dehydrated and frozen foods, candy and many others.

Oneida's complete line includes bags, envelopes, printed wraps and continuous rolls of cellophane, glassine, waxed glassine, laminates, dry wax, parchment, M.G., White Wove and other papers.

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Radiant Heating for Spuds

These sacks of potatoes are held at proper temperatures by a radiant heating system, made of wrought iron pipe embedded in the floor. The room holds 7,000 bags and the system eliminates stratification of air, thus maintaining even temperatures.

Processing Crops of 1948 Close to 1947 Total

Canners and freezers of fruits and vegetables had a crop production to pack, during 1948, that came close to the large production of 1947, according to year-end estimates of the Department of Agriculture's Bureau of Agricultural Economics.

In spite of a 9 percent reduction in acreage harvested, the aggregate 1948 production of 11 truck crops for commercial processing (canning, freezing, pickling, and other processing exclusive of dehydration) was only 2 percent smaller than the large output of 1947.

The 5,458,500 tons produced in 1948 may be compared with the 5,562,720 tons grown in 1947, the record of 6,304,100 tons grown in 1946, and the 1936-47 average of 4,820,250 tons.

Total 1948 harvested acreage of truck crops for commercial processing was 9 percent smaller than that harvested in 1947, but was about equal to average. The record high acreage of 2,100,000 was harvested in 1946. In most cases, high yields per acre offset the reductions in acreage. Yields were record high for tomatoes, lima beans, and sweet corn, and above average for the balance of the 11 crops except asparagus, green peas and spinach.

Farmers received record-high prices per ton for 7 of the 11 crops reported. Record prices for processing were received for asparagus and tomatoes in 1946 and for cabbage and spinach in 1943. The aggregate value per ton for all 11 crops combined was $39.27 per ton, almost as high as the record of $39.58 per ton received in 1946. The total value of the 11 crops produced was estimated at $214,000,000, slightly more than in 1947, and second only to the record of $249,000,000 in 1946.

Incomplete data indicate that the total 1948-49 commercial pack of canned vegetables will be somewhat smaller than the 1947-48 pack and below any other year's pack since 1940. Final pack figures are expected to show some increase over the 1947-48 pack of lima beans, snap beans, beets, carrots, sweet corn, tomato juice, sauerkraut (including bulk), and white potatoes. Major decreases from the 1947-48 quantities canned are expected in canned green peas, tomatoes, and tomato products other than tomato juice, BAE reports.

Canners' stocks of green peas on December 1 were substantially lower than a year earlier, but their stocks of canned corn were considerably larger. Stocks held by wholesale distributors on November 1 were smaller than a year earlier for snap beans, green peas, tomatoes, and tomato juice, but were considerably larger for canned corn.

Total Stocks

With total supplies of canned vegetables lower in late 1948 than a year earlier, and with the expectation of a continued high rate of consumption of canned vegetables this winter, stocks may be somewhat lower at the beginning of the 1949-50 pack year than they were at the beginning of the 1948-49 season.

Tentative estimates of the quantity of vegetables frozen in 1948 indicate that the combined total may be slightly larger than the quantity frozen in 1947. Final figures are expected to show substantial increases in pack of

frozen green beans, lima beans, spinach, asparagus, and a number of minor vegetables. On the other hand, substantial reductions in pack compared to 1947 are indicated for frozen cut corn and frozen green peas.

Commercial storage stocks of frozen vegetables on December 1 totaled 306,100,000 lb., well below the 324,000,000 lb. a year earlier, but about one-fifth larger than the 5-year 1943-47 average for that date. First-of-the-month holdings declined more rapidly in the first 6 months of 1948 than in the same months in 1947, but in the latter half of 1948 built up again more rapidly than in 1947.

December 1 stocks of frozen lima beans, snap beans and brocolli were higher than a year earlier; stocks of other frozen vegetables were lower. More than 70 percent of the December 1 frozen stocks were composed of green peas, lima beans, sweet corn, and snap beans.

The record rate of consumption of frozen vegetables, established in 1948, is expected to continue well into 1949.

Sugar Price Stays High On the New Quotas

There was no sweetness for industrial users of sugar—but a little for the producers of sugar—in the figure set by Secretary of Agriculture Brannan as his estimate of U. S. sugar consumption for 1949, under the Sugar Act.

The figure he picked—7,250,000 short tons—indicated strongly that he felt, on the basis of the evidence he got from trade and government sources that:

1. Sugar consumption in the early months of 1949 would continue on about the same rate as it had during the last months of 1948.

2. The price of sugar during the last months of 1948 was about right—or perhaps a shade too low.

U. S. food processors—the makers of soft drinks, baked goods, candy, and ice cream, for instance—had asked that the secretary set his consumption figure as high as 7,900,000 tons (which would force sugar prices down), while the U. S. sugar producers had asked for a figure as low as 6,900,000 tons (which would hold sugar prices up).

The Secretary, in resolving the conflicting political and economic counterpressures by these two groups, drew a line that indicated to trade observers that the Department would not be unhappy over a slight increase in the price of sugar—which was bad news to industrial users.

On the other hand, the sugar pro-

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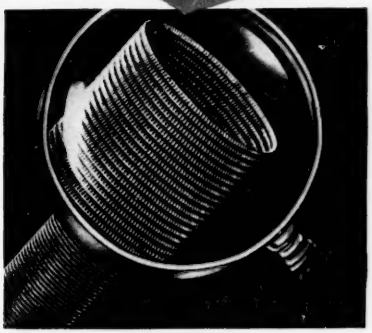
THE SCREEN IS THE THING



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A Pinch of Salt

Since Roman times, salt water has been evaporated at Maldon, England, where the Blackwater estuary cuts deep and wide into Essex, leaving high salt concentrations. The sea water is filtered and boiled in an open pan, then left to cool for 12 hr. The owner of this three-man salt plant is seen here shoveling the pure stuff into storage.

ducers, who draw some comfort from the Department's attitude, know that if sugar prices scoot upward too far and too fast, the Secretary has full authority to revise his determination (in effect, permitting more imports) to push prices down again.

This was what happened last year —both ways. The figure was set initially at 7,800,000 tons) in the expectation of a high demand for sugar. When this did not materialize, sugar prices began to fall, and within six weeks a new determination was made, setting the figure at 7,500,000 tons. This was later reduced again to 7,000,000 tons. Finally, another revision, this time upward, was made to 7,200,000 tons, the final figure for 1948.

Reason for Action

The USDA announcement had this to say about the various factors that the department's experts took into consideration in making the determination—

Sugar distribution: For the twelve months ending Oct. 31, 1948, it was 7,124,000 tons. The USDA figured that distribution during the 1949 calendar year would be 7,300,000 tons.

U. S. sugar inventory: USDA felt that stocks of sugar held by refiners at the year end was about normal, so it made no allowance for either a surplus or deficiency in inventories.

Changes in consumption: USDA figured that high consumer spending of 1948 would continue at about the same level into 1949, but that it was unnecessary to make any allowance for increased consumer demand in 1949.

Sugar prices related to the cost of living: The department's announcement declared that sugar prices had declined during 1948, while costs of production, processing, and distribution had risen. Prices at the end of the year were found to be "somewhat below the relative levels indicated in the Sugar Act."

Sunshine Adds Bakery At Kansas City

Sunshine Biscuits, Inc., which operates 23 plants and over 100 warehouses throughout the country, will open a new plant in Kansas City, Mo., late this spring.

The plant, called by the company the world's most modern bakery, is more than 1,200 ft. long and has 800,000 sq. ft. of floor area. It will house ovens more than two city blocks long, and machinery for both biscuits and candy. There will be air conditioning, and a maximum of light through specially selected glass, which will not only permit a maximum of daylight but will be heat-absorbing and glare-reducing as well.

Two parallel railroad spurs, running the length of the building, will accommodate 40 railroad cars for loading and unloading at the same time. The new plant will employ about 1,000 people.

New Citrus Agreement

National Research Corp. and Vacuum Foods Corp. have revised the license agreement under which the latter had been producing its frozen orange concentrate, packed under the "Minute Maid" label. According to the new terms, Vacuum Foods' license is made non-exclusive. Royalties do not apply to by-products and are based on gallons of citrus juice processed rather than on gross sales.

Vacuum Foods was originally organized by National Research, which held exclusive rights in the U. S. to all of Vacuum's developments in the citrus field.

Pretzel Institute

Alex V. Tisdale, Pennsylvania Butter Pretzel Co., Easton, Pa., was recently elected president of the National Pretzel Bakers Institute, with Jack Steinberg, Royal Guest Foods, Inc., Los Angeles, named first vice-president and Angie Grippo, Grippo Cone & Pretzel Co., Cincinnati, second vice-president.

The institute has been incorporated in the state of Delaware and will maintain headquarters in Philadelphia. In addition to its promotional activities, the institute will carry on a research program on economical and attractive packaging technics, mechanical improvements in the plant, good baking practices, and analyses of ingredients.

Lockers Up

Raised and lowered by electric hoists, the lockers come up to the renters in this plant at Franklin, Calif. The 0 deg. F. freezer space is underground with insulated floor and walls. Advantages include customer operation from an area of non-freezing temperatures, high percentage of refrigerated space in actual use, lower cost of initial installation, and no wear on insulation.

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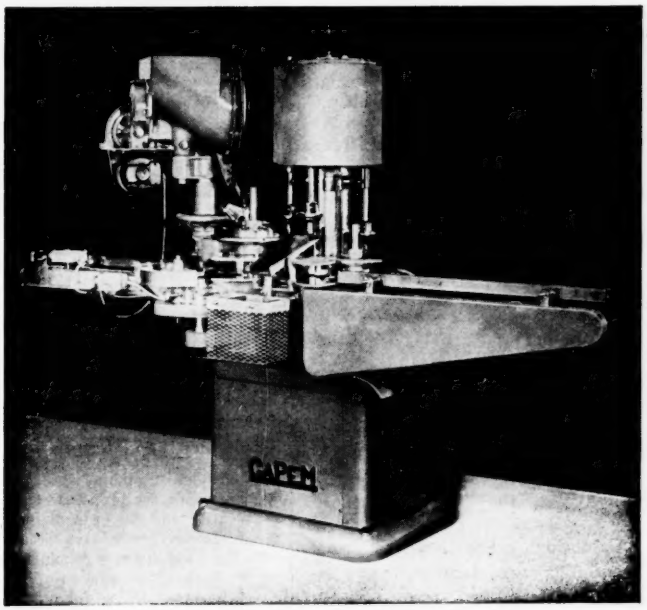
CAPEM

THE MODERN SCREW CAPPER



- Applies any type of standard screw cap or cover at speeds of 2000 to 10000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
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Special fixtures for any process or handling requirement.

For washing, blanching, freezing, cooking of any food product.

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Wire cloth in rolls. Any metal or alloy, mesh or weave.

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Mass Produced Chicks

This three-decker brooder house at Walpole, N. H., has a capacity of 21,000 chicks. Bred from pedigreed hens, the 12,000,000 chicks hatched annually here and at Lancaster, Pa., are shipped all over the country.

PROCESSING

Frozen Food Packers Propose Their Own Food Standards

A complete regulation and supporting arguments for proposed standards of identity and fill of container for major frozen fruits have been filed with the Food & Drug Administration by the National Association of Frozen Food Packers. Filing followed hearings on standards held by the Food & Drug Administration this summer.

In announcing filing of the proposed regulation, a spokesman for frozen fruit packers stated that industry's proposals reflect the careful consideration that has been given to problems of both industry and consumers. Packers do not want the regulation so written as to guarantee an economic advantage to particular supplying groups, or to control manufacturing procedures as such. The packer group has consistently maintained that the proposed standards must apply to the finished product and not to methods of manufacture. Finished product standards will best protect consumers.

In presenting arguments supporting their proposed regulation, packers called attention to the fact that consumers desire different degrees of sweetness in the finished product, and on that basis the industry wants a provision in the standards for light sirup packs.

The packer group also took the position that labels need show only those facts which will permit the consumer to choose between different packages of the same item, and those facts which will influence the use to which the consumer will put the product. So far as other facts are concerned, the industry believes that the standard itself protects the consumer.

Because many packers foresee the possibility of important developments in the packing of frozen fruits and berries, the frozen fruit industry contends that provisions in the regulation must be carefully considered so that these prospective innovations will not be restricted or prohibited.

USDA Research Revealed In Annual Reports

Food processing research being done by the various research bureaus of the Department of Agriculture comes to light when the agencies publish their annual reports. Some highspots reported thus far:

Office of Experiment Stations. Citrus processing: Preliminary data on the costs of packing and processing citrus fruits were obtained from 73 packing houses in Florida and 27 in Texas in a cooperative regional study undertaken with Research & Marketing Act funds. Wide variations encountered indicate that these costs could be considerably lowered for the industry as a whole.

Bureau of Dairy Industry. Milk storage: In studying the development of an oxidized flavor in milk frozen for storage, researchers found that a strong flavor occurred when only small amounts of ascorbic acid were added to the milk before freezing, while the flavor developed at a much slower

rate when the milk was heavily fortified with acid.

Dried whole milk: A series of tests revealed that keeping quality improved when dried whole milk was heated out of contact with air before it reaches the drier.

Sweetened condensed milk: Preliminary results from one phase of a long study of thickening of sweetened condensed milk showed that a high temperature forewarming procedure produces a milk of lower viscosity than the customary forewarming procedure.

Evaporated milk: The crystalline deposit which develops in some samples of evaporated milk during storage is largely calcium citrate, Department researchers learned. Growth of the objectionable crystals may be accelerated by agitation of the cans during early storage, tests indicate. Holding the milk at cool temperatures rather than room temperatures or higher may retard the crystal growth.

Work on Waste Conversion At Regional Labs

Production of yeast from agricultural wastes represents "the conversion of an almost worthless material into a valuable and needed product." This is the opinion of W. D. Ramage and J. H. Thompson of Western Regional Research Laboratory, Albany, Calif.

Wastes from the canning of vegetables and fruits in the U. S. total nearly 5,000,000 tons annually. This is in addition to citrus wastes which, except for press juice, are largely utilized in feed manufacture. Much of this waste cannot be economically reprocessed, but large amounts of material are going to waste.

Methods have been developed at the Eastern Regional Research Laboratory, Philadelphia, for converting some of the vegetable processing wastes to a high protein leaf meal, but fruit processing wastes are regarded mainly as disposal problems at the present time.

Principal consideration has been given to three processing residues: Juice from asparagus butts (which appear to be the only suitable vegetable material); citrus peel press liquor; and juice from pear waste.

In the case of juice from asparagus waste, no pilot plant studies have been made on the growing of yeast because this material has been considered to have greater value as a culture medium for other micro-biological processes. The readiness with which various micro-organisms grow in a culture medium prepared from asparagus juice indicates that no difficulty

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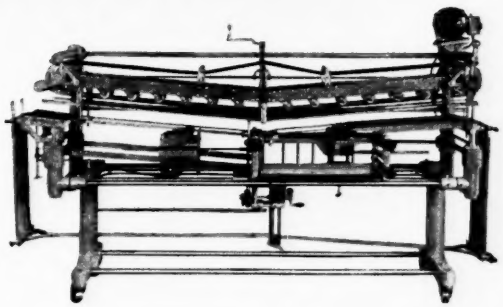

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CRCO-New Way Labelers are fast, dependable and economical in operation . . . the type of equipment that will reduce labor costs and speed up operations in any plant handling cylindrical glass or tin containers.

Wrap-around or spot labels can be applied on the same fully equipped machine. Has wide versatility and it is easy to change from one size label or container to another, depending on your production requirements. Can handle containers ranging from 2" to 6½" in diameter and up to 9" in height. Will also handle long-neck bottles, pails with bale-ears or jugs with handles.

Send for the new Bulletin illustrating the complete line of CRCO-New Way Labeling and Casing Machines and Accumulating Feed Tables.

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Jumbo Shrimp Fresh from the Water

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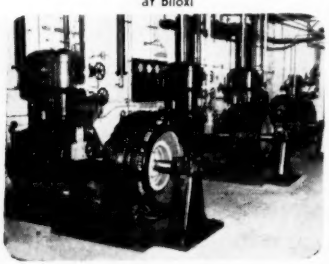

will be encountered in using this material as a yeast nutrient if other outlets fail to materialize.

Disposal of citrus peel press liquor is a serious problem in some areas. It has been estimated that each 90-lb. box of citrus fruit will yield about 3 gal. of peel press liquor of approximately 10 percent soluble solids. From these 3 gal., approximately 1 lb. of dry yeast can be produced. On this basis, potential yeast production from Florida citrus processing operations alone might amount to 25,000 tons per year.

In the case of pear waste, no commercial practical type of press has thus far been developed, and commercial use of pear waste juice probably hinges on development of such a press. Prospects for practical success appear to be good, especially if waste disposal is included in profit and loss evaluations.

Will Also Protect Process

Because of the current seriousness of waste disposal problems and protein feed shortages, it has been deemed advisable to perfect the process for yeast propagation on pear juice concurrently with development of a press. Pilot plant development on a process for growing Torula yeast on a wort prepared from pear-waste juice has reached the point where commercial application of the process will probably be practical as soon as a suitable continuous press becomes available.

The economies of the process largely depend on this juice separation step, but it has been roughly estimated that, when the press becomes available, the disposal costs now charged against pear waste will appear as a somewhat larger figure on the credit side of the ledger.

QMC Publishes Booklet On Meat Products

Meat Products, latest booklet in a 13-volume series being published by the Quartermaster Food & Container Institute for the Armed Forces, Chicago, is now available for distribution, according to Lt. Col. Joseph S. Kujawski, Commanding Officer of the Institute.

This new volume in the series entitled "A Report of Wartime Problems in Subsistence Research and Development," deals with the Army's research and development on meat products during World War II. Among the various topics discussed are, "The Meat Products Branch," "The Place of Meat in the Soldier's Diet," "Frozen Meats," "Cured and Smoked Meats", and "Canned Meats". The book is 110 pages in length.

Authors of the treatise are Capt. Joseph Czarnecki, wartime Officer in Charge of the Institute's Meat Products Branch, Lt. John C. Pierce, Jr., Lt. Col. Jesse H. White, and Mr. Bertram W. Gardner, Jr. The material was edited by Capt. Hewitt A. Conway and Miss Alice I. Meyer.

Although the volume is designated as No. 11 in the Operation Studies, it is the fifth thus far published. Other volumes in the series, which have been published and released, are *Subsistence Packaging and Packing, Fruit and Vegetable Products, General Products,* and *Ration Development.*

Pepper and Cocoa Beans Reported at Low Levels

Warehouse stocks of pepper and cocoa beans in the United States, were at extremely low levels in 1948 compared with prewar years, according to the Department of Commerce.

In the year-end issue of the Coffee, Tea, Cocoa and Spices Industry Report, recent warehouse stocks of unground pepper are reported at 340,000 lb., as compared with the prewar all-time high in Port of New York warehouses of about 100,000,000 lb. The prewar level represented a two to three year supply. Imports of unground pepper during the January-to-October 1948 period totaled 25,000,000 lb.

Recent warehouse stocks of cocoa beans in the New York area amounted to 3,000,000 lb., as compared to about 200,000,000 lb. before the war. In the first ten months of 1948, imports of cocoa amounted to 472,000,000 lb. For the same period in 1947 imports amounted to 499,000,000 lb.

The import value of cocoa beans was at an average of 34.7c. a pound during the January-to-October period of 1948, an increase of 36 percent over the average value in 1947.

Millers Name Committees To Study Infestation

Two research committees have been appointed by Roy K. Durham, technical service director of the Millers' National Federation, in accordance with recommendations made at a recent flour mill insect and rodent control conference held in Chicago.

The conference was the result of a growing realization that more research is needed to solve some of the problems connected with insect and rodent control, as well as with the maintenance of flour purity.

Dr. R. T. Cotton, U. S. Department of Agriculture Bureau of Entomology & Plant Quarantine, announced that

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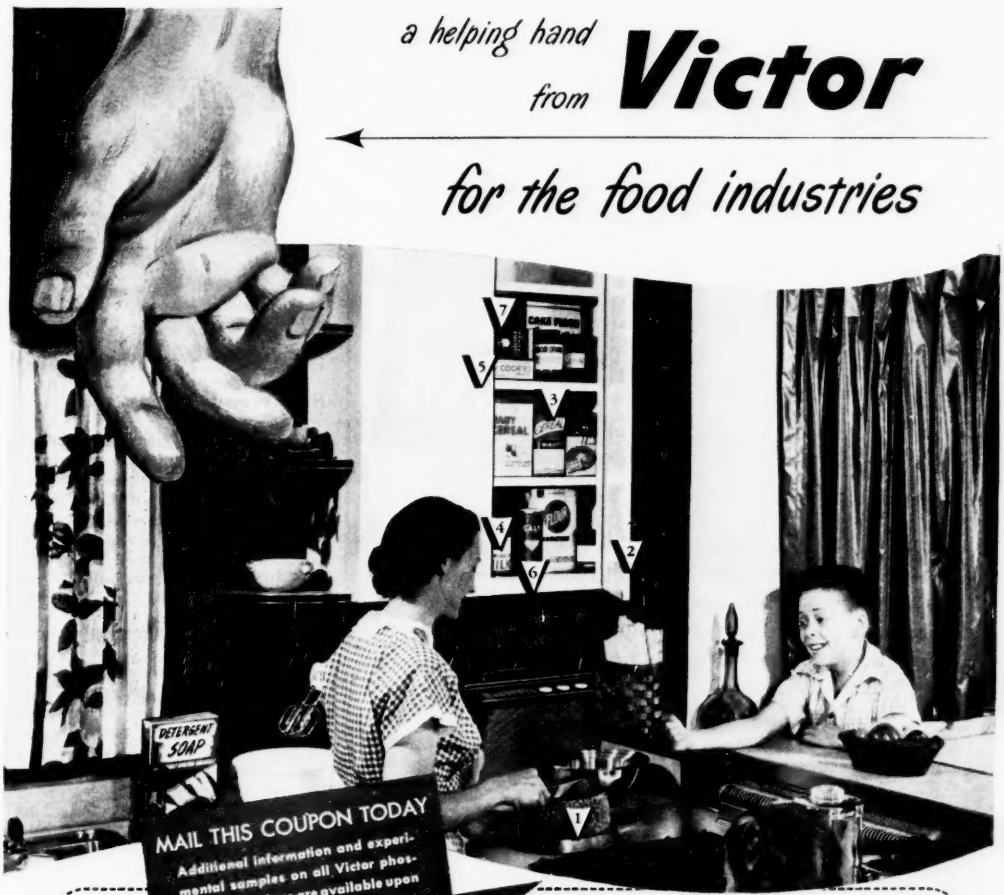
for the food industries



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- V3 Victor calcium and iron phosphates . . . mineral enrichment of cereals, food beverages. ☐
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- V5 Vicream monocalcium phosphate . . . acid leavening ingredient for cookies. ☐
- V6 Victor tricalcium phosphate . . . conditioner for table salt. ☐
- V7 Victor dicalcium phosphate . . . mineral enrichment of graham crackers. ☐

a helping hand for you . . .

For over fifty years, Victor Chemical Works has specialized in the development and manufacture of food phosphates. Many times the application of a Victor phosphate has aided in the production of a better product with resulting increased sales for its manufacturer. Victor's experience and laboratory facilities are offered as a helping hand to all the food industries.

*TRADE MARK

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

V-7

VICTOR CHEMICAL WORKS

World's Largest Manufacturers of Food Phosphates

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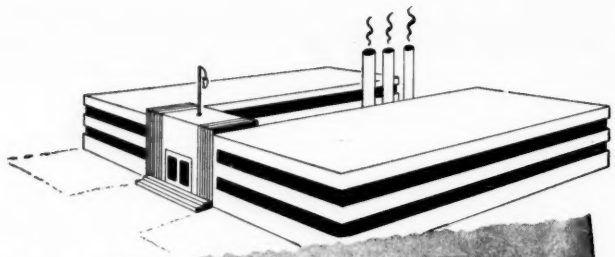


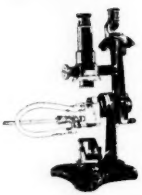
WHERE FOODS
ARE PROCESSED BETTER
you find SPENCER INSTRUMENTS

MORE and more, Food Processors are finding it's PROFITABLE to produce better quality. Spencer instruments in the laboratory or on the production line play an important part in improving and maintaining quality products. For descriptive literature write Dept. 049.

MOLD. Spencer Microscopes especially equipped for routine counting of mold or more extensive study in the canning industries.

BACTERIA COLONIES Darkfield Quebec Colony Counter to estimate bacterial concentration in dairy products.

CONCENTRATION. Direct Result Colorimeter for chemical or biological tests where color density indicates composition quantitatively.



DISSOLVED SOLIDS Spencer Refractometer to determine total dissolved solids by measuring refractive index.

IMPURITIES. Stereoscopic Microscopes to simplify identification and counting of fragments, adulterants, etc.

INGREDIENTS. Polarizing Microscopes for identifying fillers, fibers, alkaloids, crystals, starch grains, etc.

American Optical
COMPANY
Scientific Instrument Division
Buffalo 15, New York

Manufacturers of the **SPENCER** *Scientific Instruments*

High Pressure Food

Lofty altitudes and rapid air pressure changes have little effect on fresh fruits and vegetables, according to tests made at Lockheed Aircraft Corp.'s altitude chamber by the Department of Agriculture. W. R. Barger, USDA, is shown here preparing perishables for tests. It was also determined that control of humidity and temperature is important.

he plans to conduct intensive research on control of insect infestation in boxcars, and he suggested the selection of a volunteer committee from the milling industry to collaborate with him. This committee consists of: George S. O. Smith, Flour Mills of America, Kansas City, Mo.; John Giertz, Kansas Milling Co., Wichita, Kan.; Paul McSpadden, Commander-Larabee Milling Co., Minneapolis, Minn.; A. J. Mattis, Midland Flour Milling Co., North Kansas City, Mo.; Eric J. Kiteley, International Milling Co., Minneapolis, Minn.; George B. Wagner, Pillsbury Mills, Inc., Minneapolis, Minn.; and C. B. Long, Igleheart Bros., Inc., Evansville, Ind.

Studies of J. C. Frankenfeld, who is associated with Dr. Cotton, have led to the development of a method to detect infestation present inside of wheat kernels. To hasten the day when the method can be satisfactorily put to practical use, the following resolution was adopted:

"In order to correlate the existing isolated efforts and to concentrate upon an intensive research program, it is moved that Durham, as chairman, appoint a committee from this group which shall be representative of the milling industry to cooperate with Dr. Cotton in the development of means to determine more accurately:

1. Relative importance of hidden infestation within wheat kernels.

2. Technics and methods for the practical detection of such infestation,

with accumulation of such data as will support changes in the Federal Grain Standards designed to more accurately express to the milling or other food processing industries the degree of contamination of cereal grains which are our principal raw products and which must be contaminant free if we are to produce a human food free from undesirable extraneous material."

A committee was appointed to carry out instructions contained in the resolution. It consists of George B. Wagner, Chairman, Paul McSpadden, Eric J. Kiteley, John Giertz, Chas. A. Williams, Williams Bros. Co., Kent, Ohio; Eldon Smurr, American Flours, Inc., Newton, Kan.; and J. E. Zvanovec, National Biscuit Co., Toledo, O.

Food Processing Patents Listed in Booklet

The Department of Commerce, in an attempt to spread the usefulness of its Patent Office, has published a 60-page booklet that lists a great number of its "patents available for licensing or sale" in the food, food processing, and food equipment industries.

The publication is the first of a projected series, each of which would list a number of patent ideas in a group of related industries.

Purpose of the booklet is to gather together in easily-checked form a few of the vast number of ideas which the inventor or owner of the patent rights is willing to license or sell to a commerical interest.

Water Pollution Functions Are Revised by USPHS

The U. S. Public Health Service has reorganized its sanitary engineering branch to carry out more effectively the functions assigned to it by the Water Pollution Control Act of 1948. In place of the former Sanitary Engineering Division, the organization now has two divisions—one for water pollution control, the other for sanitation.

The change expands the former Water Pollution Control Section into a full-fledged division of the same name. Its chief purpose, as directed by the law, is to give financial and technical assistance to the states in formulating and carrying out their stream pollution control programs.

The division takes over 14 river basin offices that will serve the states, interstate agencies, municipalities, and industries in their drainage areas. Two of the offices are already operating, and the division expected three to five more, early this year.

Continued

CLEAR JEL *has everything!*

COUNT 'EM One . . . Two . . . Three. CLEAR JEL is the only fruit pie stabilizer that offers all three! NEW COLOR . . . fruit colors reveal all their natural, appetizing sparkle. NEW CLARITY . . . full bodied fruit is deliciously tempting in smooth, clear fillings. NEW FLAVOR . . . orchard fresh flavor tantalizes your taste — again and again.

Color, Clarity, Flavor. You get all three with CLEAR JEL, now well on its way toward making fruit pies again America's No. 1 dessert.

Full details and trial quantities are ready — NOW.

Offices: 270 Madison Avenue, New York 16; Boston, Philadelphia, Atlanta, New Orleans, Indianapolis, Chicago, San Francisco, and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal. In Holland: Nationale Zetmeelindustrie, Veendam.

a fruit pie stabilizer

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This year, more than ever, you owe it to your plant to remove all unnecessary handling from your production. It's the one *sure* way to reduce operating costs. 48 years' experience in all types of handling systems for all types of industry is at your disposal. Why be satisfied with less?

When may we discuss the latest materials-handling and products-handling methods with you? Write today—or, without obligation, write for folder.

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Export Commodity Numbers Revised and Expanded

Food exporters—and all food executives interested in statistics on food shipments abroad—are studying the new 1949 edition of Schedule B, the Bureau of Census publication containing the commodity numbers that must be used on government forms required for export shipments.

The 1949 edition of this essential publication represents the first revision since 1944. There are about 300 new classifications of commodities or products in the 1949 edition, derived through breakdown of general classifications or miscellaneous "not otherwise specified" classifications.

This means that from now on there will be detailed export information available for some 300 products, including food products, which heretofore have been lumped in with a "basket" category.

Besides this information on commodity classifications and numbers, the 1949 Schedule B contains up-to-date information on provisions of the government's export control, the Atomic Energy Act, State Department regulations, and the directions issued by the Economic Cooperation Administration.

Among the new food products for which specific export figures will now be available, are these:

Canned baby foods, meat, vegetable, fruit, custards, and puddings; bakery products, now classified as a group by themselves; prepared food mixes; frozen vegetables and frozen fruits, as distinct from fresh vegetables and fresh fruits; and soluble coffee.

Candy Manufacturers' Sales Reach $1,000,000,000

Candy manufacturers sales reached the billion dollar figure in 1948, according to preliminary estimates of the Department of Commerce. Sales at wholesale amounted to $1,050,000,000 and output reached 2,760,000,000 lb.

While per capita consumption, estimated at 18.8 lb. in these early figures, was slightly under 1947, it was 4 to 5 lb. higher than the prewar per capita consumption. Average price per pound went up almost 4c. in 1948, reaching 38c. as compared with 34.1c. in 1947, 23.5c. in 1944, and 15.9c. in 1941.

A report covering candy industry operations for 1947, which includes some preliminary 1948 figures, is available from the Department of Commerce.

Wine Use Almost Doubles Over Past 10 Years

A near doubling of national wine use in the last decade is disclosed in the Twelfth Annual Wine Industry Statistical Survey, prepared by the Wine Institute for the Wine Advisory Board.

From an average of 68,000,000 gal. a year for the crop years 1935-36 to 1939-40, national wine consumption has climbed until it now ranges between 109- and 110,000,000 gal. a year. The statistical record shows that apparent wine consumption has held firmly to that level during the last three years.

The Survey reports on apparent consumption on a crop year basis—July 1 to June 30. The total for the 12-months period ending June 30, 1948 was 115,069,000 gal., in comparison with 109,837,000 gal. in the 1946-47 crop year and 115,791,000 gal. in 1945-46.

Tin Supplies Adequate For Food Canning

While tin controls are to continue through the first half of 1949, there will be adequate supplies of tin for cans for food processing, according to H. B. McCoy, director of the Office of Domestic Commerce.

Order M-81, restricting the use of tin by can makers, was continued through June 30. It limits the amount of tin that may be used in making beer cans, animal food cans, and pigmented paint cans, also prohibits the use of any tinplate ends for animal food cans, and bans tin from being used in coffee cans or 1-qt. round motor lubricating oil cans.

The amount of tin that will be available to domestic industry during the first half of 1949 will be no larger than the amount actually distributed during the first six months of last year.

The increased amounts of tin that are expected to be delivered to the U. S. during these next few months will be shunted into the stockpile. Stockpile figures have been climbing regularly (they are not made public), but even the leading tin users admit that the present stockpile compares very unfavorably with the amount on hand immediately before the outbreak of World War II.

Allocations of tin to domestic users have been running somewhat above 7,000 tons a month. In contrast, the Munitions Board reported last fall that it anticipated receiving into the stockpile only 4,500 long tons of tin during the twelve months ending June 30 of this year.

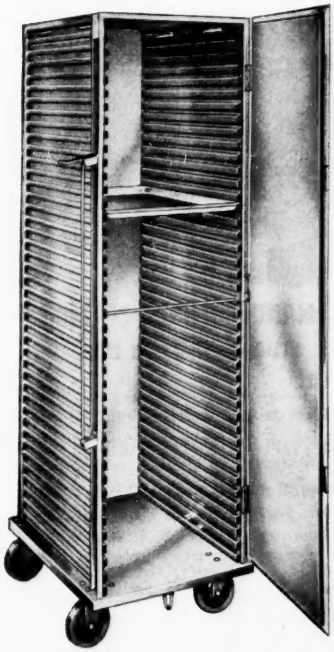
(Continued)

TAKE THE RED INK OUT OF HANDLING COSTS

OTHER BAKERS have already proved, and you can too, that the high cost of handling bakery products from oven to store can be greatly reduced. CRESCENT CABINETS are light—yet sturdy, and carry a large volume (41 pans). The whole truckload goes farther at lower cost.

Employees are happier because their work is lighter. WOMEN handle units easily. ONE MAN per truck makes deliveries.

You take the RED INK out of handling costs when you deliver your baked goods in Crescent Cabinets. Check these Crescent advantages against any other system.



- All pans fit—whether old or new
- Only one man on each delivery truck
- Eliminate 1 truck in each 4
- Save all expenses of 4th truck
- 60% less product breakage
- Shorter delivery stops
- Easy to clean and keep clean
- Easily handled loaded by women

Loading Cabinet

Unloading Truck

"41" Holds 41 bun pans. Height 69 3/4". Net Wt. 105 lbs.

"33" Holds 33 bun pans. Height 57 3/4". Net Wt. 99 lbs.

Prepare for the future with its keener competition, lower prices, and narrower margins by taking the RED INK out of handling costs. For greater profits tomorrow, write, wire, or phone us today.

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Lunkenheimer Valves in the process lines at the fermenters used in the production of penicillin and streptomycin.

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IN the manufacture of the wonder drugs, penicillin and streptomycin, it's small wonder that Lunkenheimer Valves are included with other items of the finest-obtainable processing equipment. Intermediate compounds in the ratio of approximately five thousand units to one of finished product are flow-controlled by hundreds of Lunkenheimer Valves.

For dependability over long periods of service, these valves at Abbott Laboratories illustrate the way all phases of industry and commerce rely on Lunkenheimer Valves. This same low-cost service can be a profit factor in your operations.

WHETHER YOU'RE PLANNING a new plant, expansion of present facilities or modernization . . . you can specify Lunkenheimer Valves with utmost confidence. Available through Distributors in all industrial centers.

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McGRAW-HILL World News

Argentina Makes Big Gains In Fruit Crop Totals

BUENOS AIRES—The fruit crop in Argentina promises to be exceptionally large this year with one area alone reporting its 1949 crop will be fivefold the amount packed last year. The Coporación Frutícola Argentina reports that the Upper Valley of the Rio Negro and Mendoza will ship 10,000,000 boxes of plums and grapes this year alone, compared to 2,000,000 boxes last year.

Combined with the recent agreement with the U. S. whereby Argentine fruit growers were given permission to ship fruit to the States with no other measure against fruit fly being necessary than cold storage while aboard ship, it is predicted that this fruit will undoubtedly show up on the North American market.

As the growing seasons are the reverse of ours in the southern hemisphere, fruit is ready for picking in January, February and March in Argentina. With the need for dollar exchange, the government is expected to encourage this trade, which in the past has been more or less of a minor nature.

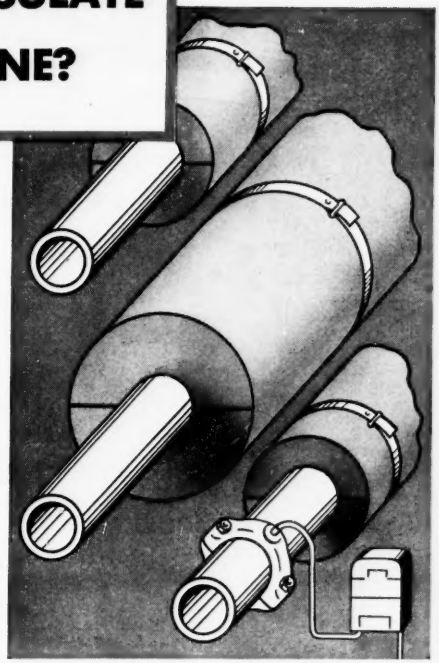
Carnation Co. Considers Plant in Australia

MELBOURNE — The Carnation Co., Ltd., Toronto, Canada, subsidiary of the American milk-processing company, is planning to make profits from Australia's contented cows. The vice-president and treasurer of the Canadian company has been touring dairying districts in New South Wales and South Australia and is returning to Toronto to report on the commercial possibilities of a branch plant down under.

The Carnation official found that one of the greatest problems would not be cows or milk, but tinned steel sheet, of which there is a considerable shortage in Australia. In case an Australian subsidiary should be set up, the company will have to look to Hong Kong, Malaya, India and Indonesia for their bread-and-butter business, besides selling a large part of their production to Britain. The

(Continued)

HOW WOULD YOU INSULATE THIS HOT LIQUID LINE?



A 3" line running 100' through a 75° F. room carries a hot, viscous fluid at 225° F., flowing continuously at the rate of 40' per minute. Temperature of the fluid at the delivery end must not drop more than 5° F. How would you hold the proper temperature in the line?

- ☐ Standard thick 85% Magnesia
- ☐ 3-inch thick 85% Magnesia
- ☐ External heat source and Standard Thick Magnesia

Here's what the Armstrong engineer recommended:

In industries where control of process temperatures is vital to successful operation, insulation can be designed to help hold those temperatures accurately. Writing the specification that best meets the requirements of the job calls for careful study of all factors involved, as well as a thorough knowledge of just what insulation can do and its limitations.

In the problem outlined above, with the liquid flowing through the pipe continuously, the Armstrong engineer calculated that 3" of 85% Magnesia would hold the temperature to within the allowable 5° of 225° F., at the delivery end of the 100' run of pipe.

However, on jobs where pipe runs are long and flow is intermittent, no practical amount of insulation will prevent a viscous liquid from cooling and solidifying in the line. Under these conditions, an external heat source, such as charging the line with a low voltage or running a steam tracer, should be used. These methods also need insulation to operate efficiently.

Whether you need insulation to make a process work, or to cut heating or power costs, Armstrong engineers are well qualified to help you arrive at the right specification for the particular job. And the complete contract service for heat insulation offered by Armstrong also includes a full line of top quality materials and skilled workmen to apply them.

FREE INSULATION CHART

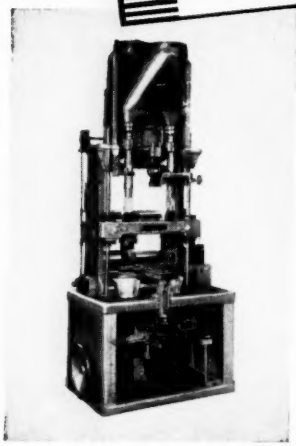
This chart lists types and thicknesses of insulation for temperatures from 300° below zero to 2800° F. Write today to Armstrong Cork Company, Industrial Insulation Department, 420 Maple Ave., Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero — To 2800° Fahrenheit

STOKESWRAP



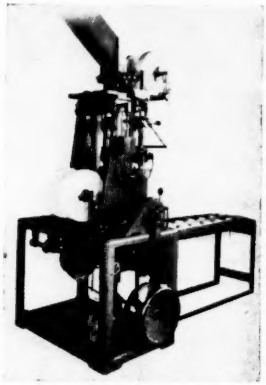
Packaging Machines

FOR POWDERS • GRANULES
SALTED NUTS • SMALL CANDIES
CRACKERS • INDIVIDUAL PIECES
AND FROZEN FOODS

Model BS "Stokeswrap" Packing Machine

The "Stokeswrap" Packaging Machine feeds the film (printed or unprinted) from the roll, automatically forms the package, fills with the desired amount of the product, and heat seals. Production—50 to 100 per minute. Various types of feeding devices are used to suit the product to be packaged.

We will gladly send complete details. Also, we will furnish sample "Stokeswrap" packages if you will send us a small quantity of your product.



Model AS "Stokeswrap" Packing Machine

We also make a complete line of
FILLING — PACKAGING — WRAPPING MACHINES

STOKES & SMITH Co
Packaging Machinery Paper Box Machinery

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A wholly owned subsidiary of Food Machinery and Chemical Corporation

Australian market is already steeped in condensed and powdered milk.

Though Australian authorities are not too favorable toward hard currency investments at the moment (because they increase future exchange liabilities), they do like the idea of having Carnation import fresh herd stock for distribution to dairy farms.

Dairy Congress to Study Industry Problems

STOCKHOLM—The Twelfth International Dairy Congress, which will be held in Stockholm August 15-19 next year, has sent out its preliminary program. The congress, organized by the Swedish dairy industry in cooperation with the International Dairy Federation, will be the first of its kind since 1937, when Berlin was the host.

All present-day dairying problems will be thoroughly discussed from scientific, technical, economic and organizational aspects, and partly on the basis of reports presented by the six special commissions of the International Federation.

The subjects to be dealt with have been divided into six groups: Milk production, hygiene and control; physics, chemistry and microbiology; dairy industrial technic; economics and trade; organization of the dairy industry, and tropical dairying. Between 300 and 400 papers on these subjects have been submitted by experts all over the world.

Schedule of Events

February

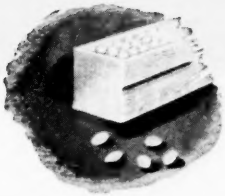
6- 8—Institute of American Poultry Industries, fact finding conference, Municipal Auditorium, Kansas City, Mo.
7-10—American Warehousemen's Assn., 58th annual meeting, Fairmont and Mark Hopkins Hotels. San Francisco.
7-18—Oregon State College, 28th annual Canners' & Frozen Food Packers' School, Food Technology Dept. Corvallis, Ore.
15-17—Michigan State College, technical school for pickle and kraut packers, East Lansing, Mich.

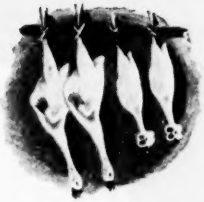
March

6-10—National Preservers Assn., annual convention, Stevens Hotel, Chicago.
7-10—National Assn., of Frozen Food Packers, annual convention and all-industry exposition, Stevens Hotel, Chicago.
7-10—American Society of Bakery Engineers, silver anniversary meeting, Edgewater Beach Hotel, Chicago.
17-18—Mayonnaise & Salad Dressing Manufacturers Assn., annual convention, Edgewater Beach Hotel, Chicago.
20-24—National Food Brokers Assn., 44th annual convention, Chicago.

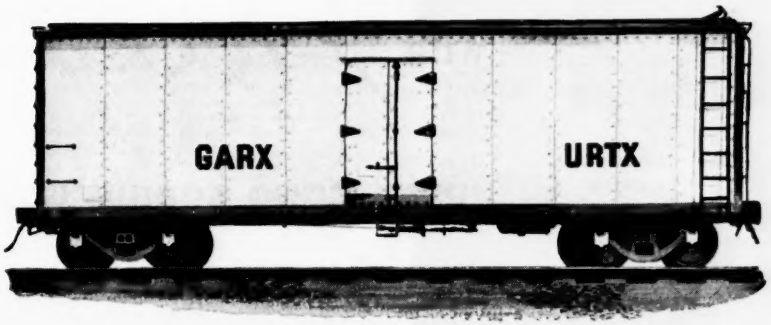
April

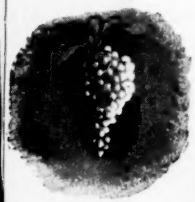
10-14—American Society of Brewing Chemists, annual meeting, Roosevelt Hotel, New Orleans, La.





Along with many other specialized types of General American cars, this refrigerator car serves the nation's shippers.



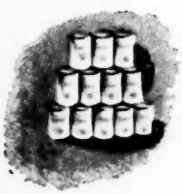


GENERAL AMERICAN

Whether you ship fruits or vegetables, meats or liquids, there is a General American Refrigerator car equipped to handle your products.

To serve you further, General American representatives located in most major producing areas are ready to help you solve your own individual shipping problems quickly and economically.

So whatever and wherever you ship, you may take advantage of General American's 50 years of experience serving the nation's shippers. And you may rely absolutely on General American's outstanding reputation for complete dependability.



GENERAL AMERICAN TRADE MARK

builds and operates specialized refrigerator cars for shipments of all kinds of perishables

UNION REFRIGERATOR TRANSIT LINES, MILWAUKEE

A Division of General American Transportation Corporation, Chicago 90

Find the Full Wealth of Natural Flavor

with *Ac'cent*®

PURE MONO SODIUM GLUTAMATE

Ac'cent improves the flavors in most meat products, poultry, fish and vegetables in freezing or canning methods. Samples will be sent upon request along with more specific information outlining the suggested testing procedures. *Ac'cent* is available in 200 pound units for bulk purposes.

Today, it seems as if the entire food world is discovering the unique advantages of mono sodium glutamate. Although it is already a standard ingredient in many familiar food products, even greater opportunities are yet to be fully appreciated. With a few comparative tests, you can readily see how this vegetable seasoning builds up the flavor characteristics in many foods.

Ac'cent is mono sodium glutamate at its best. Produced solely from vegetable sources, it is over 99% pure—odorless, colorless, and adds no flavor of its own. Thus, *Ac'cent* increases the acceptability of many processed foods by providing a taste satisfaction that is rarely attained without it.

Extensive research has proved that *Ac'cent* balances, blends, and intensifies the total flavor effect without itself being noticeable. Mushrooms, corn, asparagus, green beans, lima beans, and broccoli are made more appetizing, and the natural flavor of carrots and cauliflower are more clearly defined. *Ac'cent* raises the flavor level of most meat, poultry, and fish products, and remarkably enriches soups, consommes, bouillons, and blended seasonings. Still, it actually suppresses some other undesirable flavor notes that have hindered the popularity of certain foods.

Ac'cent is now at the service of every food processor to help guard the true food flavors all the way from processing to the table. Basic formulas need not be altered and a surprisingly small amount is required to produce pleasing results. It blends well with all other seasonings and even emphasizes their effectiveness.

Try using the time-tested properties of *Ac'cent* in your own operation, and take full advantage of those flavors naturally present in your food products.

Amino Products

DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION • 20 NORTH WACKER DRIVE • CHICAGO 6, ILLINOIS

Changes in Food Supplies

Production

CREAMERY BUTTER production in November, estimated at 78,705,000 lb., was 16 percent less than the output in October. This is the same seasonal decline that is shown for the 1942-46 average, but the decline is much less sharp than was the case in 1947 when the October-November drop was 24 percent.

ICE CREAM production held up in November, the estimated output being 34,890,000 gal. This was 7 percent larger than November production, the year before, and represented a decline of only 2 percent from October.

AMERICAN CHEESE production was estimated at 51,210,000 lb. in November, 18 percent larger than the output in November, 1947, and 14 percent above the five-year average for November. The seasonal October-November decline was 19 percent, compared with 30 percent in 1947, and the five-year average of 22 per cent.

LIMA BEANS canned in 1948 amounted to 2,476,000 cases, basis 24/2's, which was 12 percent above the 1947 pack, according to the estimates of the National Canners Association.

MACARONI produced in 1948 reached 1,163,000,000 lb., as compared with 931,710,397 lb. in 1947, according to Glenn G. Hoskins, Chicago. The 1942-46 average was 967,903,987 lb. An estimated figure was used for December in computing the 1948 total.

LIQUID EGG production in November amounted to 3,933,000 lb., compared with 4,742,000 lb. produced in November 1947.

DRIED EGG production in November totaled 855,000 lb., as against 330,000 lb. turned out during November 1947. Production for the first eleven months of 1948, however, was only 42,938,000 lb., compared with 85,399,000 lb. produced in the same 1947 period.

FROZEN EGG output in November dropped to 879,000 lb., which was only 25 percent of the 3,500,000 lb. produced during November 1947.

PEARS canned in 1948 amounted to 4,141,729 actual cases, according to the National Canners Association. This was about 1,800,000 cases less than the 1947 pack. Despite this smaller pack, and a carryover of only 801,411 cases, December 1 stocks were nearly 17 percent greater than the 2,707,000 cases reported on Dec. 1, 1947.

Materials

COMPARATIVE Totals On 11 Crops For Processing During 1947 & 1948.

Computed by Bureau of Agricultural Statistics

Crop	Production in Tons 1947	1948
Asparagus	100,100	91,800
Beans, lima (shelled)	56,490	69,460
Beans, snap	169,300	178,900
Beets	74,600	97,400
Cabbage (for sauerkraut)	72,300	201,900
Corn, sweet (corn in husk)	1,091,600	1,326,200
Cucumbers (for pickles)	245,590	231,410
Peas, green (shelled)	434,810	347,050
Pimientos	19,630	17,880
Spinach	55,500	48,900
Tomatoes	3,242,800	2,847,600
Total 11 crops	5,562,720	5,458,500

Storage

FROZEN FISH AND SHELLFISH held on December 1 totaled 157,383,877 lb., as compared with 142,102,000 lb. held on Dec. 1, 1947. Five-year average for the date: 136,389,000 lb.

COOLER OCCUPANCY dropped five points, to 54 percent, during December, while freezer space remained at 72 percent for the third month.

Indexes

BUSINESS WEEK's index of business activity slipped to 196.7 for the week ending January 8, compared with the previous week's 198.7 and 199.4 a month earlier.

THE COMMODITY index for food compiled by the New York Journal of Commerce, was down to 180.8 for the week ending January 14, compared with 180.7 for the previous week, 184.0 for December, and 207.6 for January, 1947.

CONSTRUCTION

	Pending (thousands)	Total Awarded Jan. (thousands)	1948 (thousands)
Bakery	$68	$75	$10,012
Beverages	425	218	19,728
Canning and Preserving	...	...	485
Cold Storage	...	75	1,704
Confectionery	...	300	2,335
Grain Mill Products	150	...	11,765
Ice, Manufactured	...	...	70
Meats and Meat Products	250	255	4,202
Milk Products	...	...	7,477
Miscellaneous	643	648	19,048
	$1,536	$1,571	$76,826*

*Complete corrected 1948 total

Palletize ...and SAVE with "Weld-Bilt" PRODUCTS

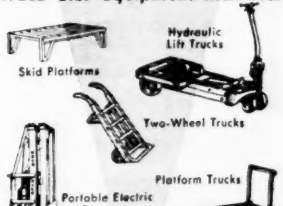
Pallet-Type HYDRAULIC LIFT TRUCKS

Savings of 50% and more in materials handling labor and time may be yours, too, with the aid of WELD-BILT Pallet Trucks!

They're easy to move, simple and safe to operate — with full ball bearing equipment, multi-stroke hydraulic action, and many exclusive features. And every detail is keyed to tough use and long service. For single or double faced pallets in capacities to two tons.

Write or wire for prices today . . . or for engineering assistance in any of your materials handling problems.

WELD-BILT Equipment Includes:



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Materials Handling Engineers
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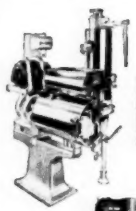
Do You Know-

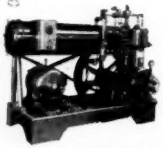
— (CP) Stands for The Creamery Package Mfg. Company, one of the world's largest manufacturers of dairy and food processing equipment and supplies — operating five factories and twenty-two branches.

CP Stainless Steel MULTI-PASS PLATE HEAT EXCHANGER

A versatile machine. Can be used for heating or cooling milk and many other products, or as a High Temperature Short Time Pasteurizer.



— CP 40-Qt. Batch Ice Cream Freezers make more batches per hour and can be supplied for ammonia or freon.



— CP has one factory devoted exclusively to the manufacture of compressors and other refrigerating machinery.

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

What Washington Thinks

By R. S. McBride, Washington, D. C.

LABOR SAVINGS

Weed killers, like fertilizers, are labor saving devices. As the wage rate for agricultural labor has come up alarmingly, these chemical aids to farming are of increasing significance. Especially important are the new weed control chemicals. But careless use may do more damage than good. Hence the Department of Agriculture is widely publicizing its new leaflet, *Using 2,4-D Safely*. This special guide deals with big business, for weed control often gives a multi-million-dollar benefit to crop growers. For example, sugar cane growers of Louisiana have benefited $5,000,000 per year from use of 2, 4-D for alligator weed alone, so say the experts.

FREIGHT STILL HIGHER

ICC granted the railroads a temporary 5 percent increase under the general freight rate investigation. Still pending is the request of the carriers for a permanent 13 percent raise. "The high cost of freighting" continues to be a major food industry problem.

MORE PROCESSING

Cranberry consumption has been growing rather steadily. And it is notable that a consistently increasing percentage of the total consumption goes to market as processed products. It is much easier to prepare a dish of cranberry jelly with a canopener than by Grandma's technic. This accounts for the fact that instead of 8 to 10 percent of the marketed crop passing through a food factory it is now a typical year when half of the total production is so treated. Incidentally, this trend does not seem to have reduced the quantity of fresh cranberries used in the home by much more than 25 percent.

PENALTY OF PROGRESS

Mechanization of agriculture frequently results in tremendous benefit, especially in late-spring, early-frost, or bad-weather seasons of other types. Under such conditions, food processors used to be able to buy only low quality crops, and these in inadequate quantity. Machinery on the farm has largely eliminated quantity shortages. But it has aggravated quality difficulties in some cases. Corn users, for example, find greater need today for special drying and care in storage during poor-quality crop years. This means that in industry storage, and where possible on the farm, the corn must be dried either before storing or shortly thereafter to prevent rapid deterioration. Industry equipment is readily available. Equivalent farm equipment is now beginning to be used. In the case of certain crops, the industrial processor is finding it worth while to study this problem clear back to the individual farm. Often, he can thereby maintain raw material quality by farmer education, with tremendous factory advantage. Naturally, federal and state authorities help with enthusiasm.

PRICE BOOST WORKED

Some folks think that Department of Agriculture efforts to influence food commodity prices do not work as well as the Department believes. Such people must have been disillusioned during recent months. Turkeys were the case in point. The Department asked for a production of 30,500,000 birds, a reduction of about 14 percent from the preceding year. Farmers did not do quite that well in cutting back the turkey hatch. But the 10 percent drop that did occur caused a 7 percent increase in market price per pound. Perhaps the Department plans for price control deserve closer watching than some of us have given them.

DEFERMENT DENIED

Washington is watching with great interest a group of appeals from draft classification among young men in the lower twenties who live in the Capital City. This number includes appeals made recently on the basis of professional training or occupation, including one each of ceramic engineer, chemical engineer, electrical engineer, and physicist. If further national appeal does not protect men of this class from early induction, Washington is going to conclude that the occupational exemption feature is not very useful.

CANNERS HAVE A NAME

The canners call them "crop technologists". That is a splendid description of the man who studies all phases of the problems of getting commercially the highest quality and lowest cost food raw materials for processing, or for the fresh products market for that matter. This man is becoming increasingly important in every division of the food business which wants to keep costs down and push quality up.

In Hawaii, one group of such technologists has boosted the yield of sweet

potatoes with maintenance of high quality for the starch factory. Western investigators tell us that they know how to grow superior sugar beets, which can be handled with a minimum of loss with mechanical field methods. As yet they have not got the sugar content of these long tapering beets up to the desired level. But that will come, so they say.

Since quality in processed product seldom can be achieved without good quality in raw material, there is an increasing need in industry for the crop technologist.

BETTER PACKAGES

The Department of Commerce says that "The container and packaging industry . . . is now in a position to furnish an adequate supply of packaging items." Food technologists will be glad to hear this, and will hope that it is true. As the supply becomes adequate, each food packaging problem can be reappraised to see whether a closer specification or a superior packaging material may not be justified. Certainly it is time to eliminate the poorer items still in use.

ANTI-TRUST, 16 WAYS

Anti-monopoly legislation is going to be sought valiantly in the new Congress. Food executives are going to be concerned with all phases of this effort. Already, proponents of legislation in Congress have identified 16 different ways in which they wish to strengthen the anti-trust laws. All deserve watching.

LARGEST OIL CROP

Soybeans are now the leading oil crop of the United States. This source was a rare one known only to a relatively few producers as recently as 20 years ago. At present, production from about 12,000,000 acres provides recoverable oil in greater quantity than available from any other oilseed. In recent years, soy oil has accounted for about 45 percent of the total domestic vegetable oil production, with 80 to 90 percent of the total being used for food processing, shortening, margarine, mayonnaise, and salad dressing. All this shows how quickly the food industries are able to adapt their activity to a new raw material supply.

BETTER BE SKEPTICAL

The 81st Congress will debate and threaten to legislate on every issue that the President's State of the Union message requested. They will even attempt some legislative efforts that the President has not asked for. But the noise and argument of Washington should not make food men think that everything talked about is going to become law. If we thought so, we'd run.

SAVE TIME, LABOR, MONEY, TROUBLE, with FMC Flat-top STEELBELT. Conveys bags, boxes, cans, and packages and products of endless variety. Made of 302 (18-8) stainless steel. Supplied in any length and in widths in multiples of even inches. Easy to clean, easy to splice. Allows free circulation of air, water, steam, etc.

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There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM RATIO COUNTING SCALE

Another Detecto-Gram Scale to speed counting operations. Model #1743 has a special counting tray attached to the beam for use when counting in odd amounts.

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Its unique characteristics make Patapar* Vegetable Parchment the ideal wrapper for delicate foods. It has high wet-strength. It is boil-proof. It resists grease.

For protection, Patapar gives you a wrapper that really helps keep your product fresh—appetizing. And its rich white texture lends beauty and sales appeal. *Patapar can be printed exquisitely with bright colors and appealing designs.* Our plants are equipped for printing Patapar economically by letterpress or offset lithography. Our art department will help create a fresh wrapper design for you with new life and sparkle.

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Men, Jobs, Companies

FREDERICK M. LINDER has been elected to the presidency of the Jacob Ruppert Brewery of New York City. Having first joined the company in 1911 as office assistant to the general superintendent, he has since served in various capacities, including purchasing agent, sales director of yeast products, treasurer, vice-president, and general manager.

CHARLES W. METCALF, newly elected president of Clinton Industries, Inc., was formerly vice-president of the firm and also board chairman of Snow Crop Marketers, Inc., a Clinton subsidiary. His long experience in food industry promotional endeavors began in Le Roy, N. Y., with the original Jell-O Co. that later merged with the Postum Co.

DAN M. HEEKIN, elected president of Can Manufacturers Institute for 1949, has been associated with the industry for over 38 yr. A graduate of Purdue U., he is now president of Heekin Can Co., which his father founded in Cincinnati in 1901. He has been particularly active in the field of lithography — printing multi-colored designs and labels directly on cans.

Industry

AUGUSTA FROZEN FRUITS, INC., was recently organized at Augusta, Ark., and will begin construction of a strawberry processing plant.

BERGEN FISKEINDUSTRI A. S. of Bergen, Norway, has signed a contract with the International Div. of the Carrier Corp. for the construction of a new freezing and cold storage plant. The new facility, scheduled to be completely installed by 1952, will step up the firm's annual capacity from 25,000 to 108,000 tons of fish, fruits and berries.

BORDEN CO. has announced the acquisition of American Dairy Co., San Jose, Calif. Business will continue under the American Dairy name, and all present personnel will be retained.

CEDARGREEN FROZEN PACK CORP., now headquartering at Seattle, reportedly planning to move its operations base to Bellingham, Wash.

COLDSTREAM PRODUCTS CO., a division of Safeway Stores, Inc., has purchased the plant formerly occupied by Kraft Foods Co. in Dennison, Tex. Kraft recently moved its operations to a Garland, Tex., plant which it had purchased from WAA.

COCA COLA CO. OF CANADA has been issued a permit for construction of a new plant in Ottawa estimated to cost $825,000.

CUDAHY PACKING CO. has opened a large poultry processing plant in Fresno, Calif.

CREAM OF WHEAT CORP. is reported to be planning construction of a $500,000 processing plant in St. Boniface, Manitoba, Canada. Capacity is expected to be double that of firm's Winnipeg plant.

CRYSTAL CITY CANNERIES has been incorporated in Crystal Lake, Tex., with capital of $40,000.

FINKBEINER PACKING CO. has announced start of construction of a $750,000 meat packing plant at Pine Bluff, Ark.

FOREIGN TYPE CHEESEMAKERS ASSN. reports plans for construction of a new cheese laboratory in Monroe, Wis. It is to be built in the Swiss chalet style of architecture.

GAYLORD CONTAINER CORP. is reported making plans for construction of a $2,000,000 plant, at Bogalusa, La., which will enable a 16 percent increase in bag production and a 39 percent increase in box production.

GIOIA MACARONI CO., INC., of Rochester, N. Y., recently acquired the 30-yr.-old Dante Food Products Corp. of Buffalo and will spend an estimated $500,000 in remodeling and in installation of new equipment.

INTERNATIONAL MINERAL & CHEMICAL CORP.'s amino products plant in Rossford, Ohio, is again producing monosodium glutamate after a nine month's cessation. The m. s. g. shutdown reportedly was due to high price of wheat gluten.

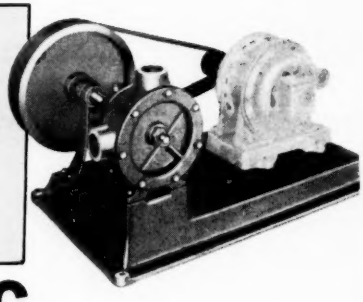
NATIONAL TEA CO. has purchased for $4,000,000 a war surplus plant in Chicago. The building, formerly under lease to Western Electric Co., will be instrumental in the company's development of new products.

OMAR, INC., manufacturer and retailer of bakery foods, has purchased a 2-acre plot near Lima, Ohio, for the erection of a branch building.

SPAULDING BAKERIES, INC., has broken ground in Binghamton, N. Y., for the construction of a $150,000 building. The new structure will be equipped to

(Continued)

MORE OF THE THINGS YOU WANT in a ROTARY PUMP



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1. Self priming — Steady and even discharge.
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3. Slow speed — Long, dependable service.
4. Built to handle the liquid being pumped — No compromise construction.
5. Complete control of manufacture — From factory-owned and operated foundries to final assembly.

Send for bulletin 100E today—It will be sent promptly.

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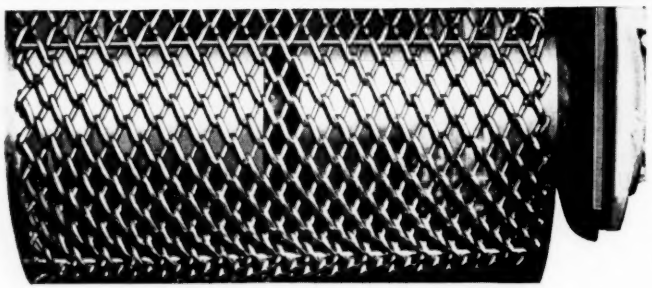

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You take no chances when you buy a Cyclone Metal Conveyor Belt . . . you are *certain* to get the belt that gives the best service possible under *your* operating conditions. Because Cyclone, in Stainless Steel or other metals or alloys, offers *three* basic styles: Chain Link (illustrated), Flat Wire and Flex-Grid. Because Cyclone has over 25 years' experience in making metal conveyor belts for industry; and Cyclone engineers—*backed by this experience*—are prepared to select or design the *proper* belt for *your* plant. Write for Free Catalog No. 4. Or get in touch with the nearest Cyclone sales office; they are in most principal cities.

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(AMERICAN STEEL & WIRE COMPANY)
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS UNITED STATES STEEL

DR. W. J. SHANNON, assistant director of research with Oscar Mayer & Co., Madison, Wis., has been appointed to the additional post of general production controller for the organization. He will have jurisdiction over the company's four plants.

step up the firm's production approximately 40 percent.

SHEDD-BARTUSH FOODS, INC., of Detroit, has purchased the Southern Margarine Co. of Greenville, S. C.

SUPERIOR PACKING CO. of Seattle has purchased controlling interest in the Columbia River Salmon Co., Inc., of Astoria, Ore.

Personnel

LUTHER K. BOWMAN has been appointed general manager of the Chef-Boy-Ar-Dee division of American Home Foods, Inc., Milton, Pa. He succeeds E. J. Fitzpatrick, resigned.

DR. B. G. CARSON has been appointed group leader of the organic and biochemistry department of the C. J. Patterson Co., Kansas City, Mo.

MAURICE CHARLAND, general sales manager of Robin Hood Flour Mills, Montreal, Canada, has been elected a company director.

CARROLL E. COLE of the Elliot Mfg. Co., Fresno, Calif., is visiting Greece as a special consultant on the handling and packaging of currants.

DAVID M. CHENOWETH has been appointed vice-president and managing director of Pepsi-Cola Co. of Canada.

RALPH. V. HUSSONG, for the last four years professor of dairy bacteriology at U. of Illinois, is now chief of the

(Continued)

Sensational Discovery

"G-4" ANTIOXIDANT PRESERVES TANGY FLAVOR OF SEASONINGS— CHECKS FLAVOR-ROBBING OXIDIZATION!

Gain Remarkable Extra Benefit by Using Griffith Seasonings Containing Bland "G-4"

• 'Til this remarkable discovery in the laboratories and experimental kitchens of the Griffith Laboratories, food processors accepted—or were unaware of—the natural oxidization that robs seasonings of their flavor-potency in the finished product. Few may believe that such a flavor-loss actually occurs, until they compare the taste of their regular soups, baked beans, ketchup, pickles, candies, baked goods, processed meats — any kind of spiced food—against sample runs which contain "G-4" Seasonings.

Food Processors Who Use Seasonings Will Recognize Application and Benefits to Them

• Sensational discovery made with sausage seasonings:

1 – Processed into a Griffith seasoning formula, OR YOURS, "G-4" retards rancidity of fats (or oils) in product—preserves appetizing flavor—checks spoilage and prolongs sales-life of product.

2 – Repeated tests reveal that "G-4" Seasonings retain their original flavor richness much longer...demonstrate extra ability of "G-4" to retard normal "letdown" in flavor potency.

Spice Flavors in Griffith's Ground and Soluble Seasonings Flavor-Stabilized by "G-4"

It's just good business judgment to check into these vital findings. Your pioneering interest will be kept confidential—the same as your seasoning formula is, if you are a Griffith customer.

You can't afford the risks in doubting or delaying. A formidable competitor may be acting now! The first to gain the exceptional advantage in using Griffith's "G-4" Seasonings can increase his sales at the expense of those who hesitate. Investigate...

Progressive Canners and Food Packers Will Investigate This Opportunity to Dominate Market with Revolutionary Flavor-Stabilized Products

• Investigate this discovery as another momentous advance in food chemistry. It offers you a rare opportunity...the initial advantage in beating competitors to the market with products of distinctive taste appeal—flavor-stabilized! Simply mail coupon, with no obligation, today.

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• ESTAX EMULSIFIERS.

Of the large range of these poly-alcohol fatty acid esters (Nos. 1 to 40), many are widely used in food manufacture, including, for example, *No. 5* (Glyceryl Mono Stearate), *No. 20H* (Propylene Glycol Monostearate), *No. 22H* (Propylene Glycol Mono Palmito-Stearate), *No. 32* (Pentaerythritol Di Palmito-Stearate).

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The most up-to-date food thickener and gelling agent, easy to handle, economical in use. Forms thick, inert, tasteless gels. Represents an improvement on methyl cellulose, being a more quickly soluble cellulose derivative (poly-galacto-xylose). Applications include: Soup and Gravy Powders, Chutneys, Mayonnaise, Purees, Cordials, Pie and Pastry Fillings, Fat extenders, etc.

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bacteriological research section at the Kraft Foods Co. laboratory in Glenview, Ill.

BURGESS H. JENNINGS, chairman of the department of mechanical engineering at Northwestern U., was recently elected president of American Society of Refrigerating Engineers.

ARTHUR A. KIESS is now head of the refinery pilot plant, development department, Armour and Company, Chicago.

DR. C. B. LANE, formerly director of research with Standard Brands' Shefford Div., has been named director of research and development of Breakstone Bros., Inc. His headquarters will be in Walton, N. Y.

DR. ORVILLE E. MAY has been elected vice-president in charge of quality control of the Coca-Cola Co. He succeeds Dr. W. P. Heath, who at 73 is retiring after almost 30 yr. of continuous service with the firm.

KEITH MORE of the Merrill Canning Co., Harlan, Iowa, has been re-elected president of the Iowa-Nebraska Canners' Assn. for the coming year.

W. STANLEY MACKLEM, Rochester, N. Y., has been elected president of the N. Y. State Canners Assn.

HARRY S. MOORE has been appointed executive vice-president and general manager of Carr-Consolidated Biscuit Co., Wilkesbarre, Pa.

CLINTON E. PETERSON, associate professor of horticulture at Iowa State College, has accepted a position with the U. S. Dept. of Agriculture and will be assigned to the college.

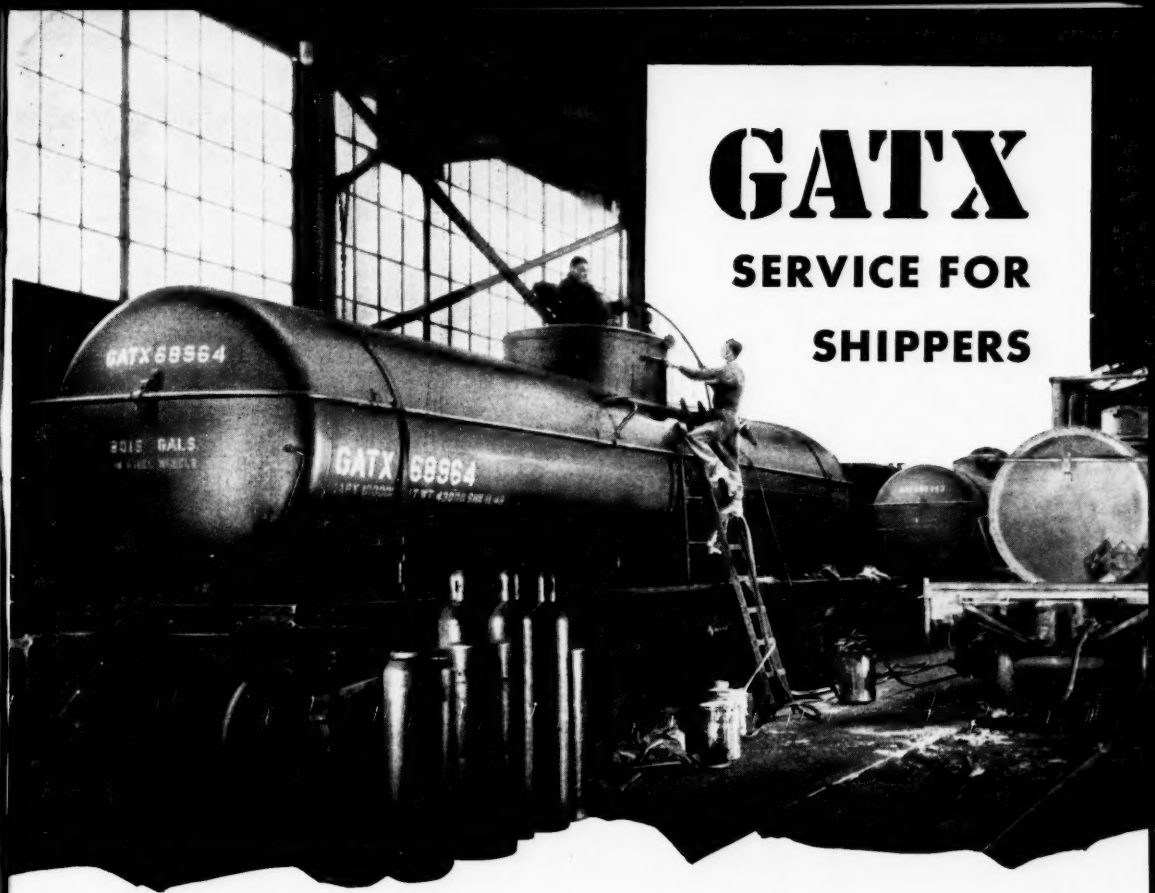
E. L. REICHART, formerly assistant secretary of the National Cheese Institute, has joined the J. S. Hoffman Co., of Chicago, in an executive capacity.

A. J. ROGERS has been re-elected president of the Michigan Canners Assn.

JACK SELIGMAN has become associated with Granny Goose Foods, Oakland, Calif., as head of the firm's candy division.

MISS TILLIE WEISBERG, president of Flotill Products, Inc., Stockton, Calif., was recently married to Meyer Lewis, general manager of the canning firm.

DR. MAX H. ZIMMERMAN, formerly chief chemist with Narragansett Brewing Co., Cranston, R. I., has been named to the newly created post of technical director at the Blatz Brewing Co., Milwaukee.



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Specialized tank cars for more efficient shipping of liquids are designed and built at General American's plants.

The GATX reporting mark identifies the General American fleet of more than 40,000 tank cars of 207 specialized types. This fleet, built in General American's own plants and serviced by General American's shops and offices everywhere, continues to give shippers the safe, economical transportation of bulk liquids they need.

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STAINLESS STEEL
EQUIPMENT

The three units of STANcase Stainless Steel Equipment illustrated below have wide application in all types of food handling plants. *ECONOMY* dictates their adoption for all operations which entail sanitary control, corrosion hazards and where it is necessary to protect quality and flavor of products.

The units illustrated are standard STANcase items which we manufacture to highest quality-specifications with *production-line economy*. Write for descriptive literature.

STAINLESS STEEL
FOOD HANDLING TRUCK No. 18

Ruggedly constructed of 14 gauge, sanitary Stainless Steel.
Inside dimensions: 43½" x 22¼" x 16" deep.
Also available in other sizes.
Seamless construction; all corners are generously rounded; maintained clean and sanitary with minimum labor.

STAINLESS STEEL TUB

Constructed entirely of sanitary, Stainless Steel.
Inside dimensions: Diam. Top 19"—Bottom 16"—Depth 13¾".
Inside surfaces highly polished and seamless. Maintained clean and sanitary with minimum labor.

STAINLESS STEEL TABLES

Top, back and sides 14 gauge, sanitary Stainless Steel.
Standard lengths: 8 ft., 10 ft., 12 ft.
Table Tops with cutting board extensions: from 30" to 42".
Table heights adjustable from 32" to 36".

Fully Approved by Health Authorities

THE STANDARD CASING Co., Inc.
121 Spring St. New York 12, N. Y.

IT'S EASY to remove TRAMP METAL with HOMER PERMANENT non-electric MAGNETIC SEPARATORS

HOMER PERMANENT NON-ELECTRIC MAGNETIC SEPARATORS

Homer

The HOMER MANUFACTURING CO., Inc.
Dept. F-10 LIMA, OHIO

Producers of Magnetic Separator Equipment Since 1923

HOMER PERMANENT NON-ELECTRIC MAGNETIC SEPARATORS

STEP AHEAD OF COMPETITION
Through Product Improvement

Our unexcelled staff of experts in Chemistry, Physics, Bacteriology, Toxicology, Engineering and Practical Market research is intimately versed in solving profit problems.
If your problem is product improvement to "step ahead of competition," or claim substantiation or reduction in processing costs, call us in. We have successfully served thousands of clients—little, large and individuals—in varied fields.
For an insight as to how we function as —or in complement to—your own research division, send for copy of "THE CHEMICAL CONSULTANT AND YOUR BUSINESS".

FOSTER D. SNELL, INC.

Chemists
Engineers

29 W. 15 St. New York 11, N.Y. WA 4-8800

Associated Industry

COOPER ALLOY FOUNDRY CO., Hillside, N. J., has named George Black as manager of its public relations division.

CROWN CAN CO. has started to enlarge its facilities in Chicago and St. Louis.

DIVERSEY CORP. of Chicago has promoted Robert Peacock, former manager of its farm quality control department, to the position of promotional manager of the dairy department.

INTERNATIONAL PAPER CO. has appointed Cedric Crain as district sales manager in Atlanta, Ga.

KIMBLE GLASS DIV. of Owens Illinois Glass Co. has promoted E. B. Dennis, Jr., to the post of general sales manager.

NORDA ESSENTIAL OIL & CHEMICAL CO., New York City, announces appointment of Harry C. Bartold as vice-president of its Chicago division.

PACKAGE MACHINERY CO., Springfield, Mass., has promoted E. G. Westervelt to the position of eastern sales manager.

FOSTER D. SNELL, INC., New York City, has named John J. Mahoney as its director of engineering.

VOSS BELTING & SPECIALTY CO. is now located at 5645 N. Ravenswood Ave., Chicago 40.

Deaths

W. FRED ANHEUSER, 77, vice-president of Anheuser-Busch, Inc., Dec. 13, in St. Louis.

LOUIS B. DORR, 68, former executive vice-president of Jacob Dold Packing Co. of Buffalo, Dec. 6, at his home after a long illness.

A. K. EPSTEIN, 58, president of Emulsol Corp., of Chicago, and American Palestine Trading Corp., of New York, Dec. 22, in Tel Aviv, Israel, of a heart attack.

DR. F. F. FLANDERS, 72, nationally known food analyst, Dec. 16, at Wellesley, Mass.

G. E. W. HARRISON, 50, president of Harrison Bros. Ltd., Montreal, Canada, Dec. 25, at his home.

JOHN D. MCNAMARA, 65, operator of M & M Packing Co., Buffalo, Dec. 16, after a heart attack.

A HOT TIP on a profit winner

AUTOMATIC RETORT CONTROL that makes *every* cook your *best* cook

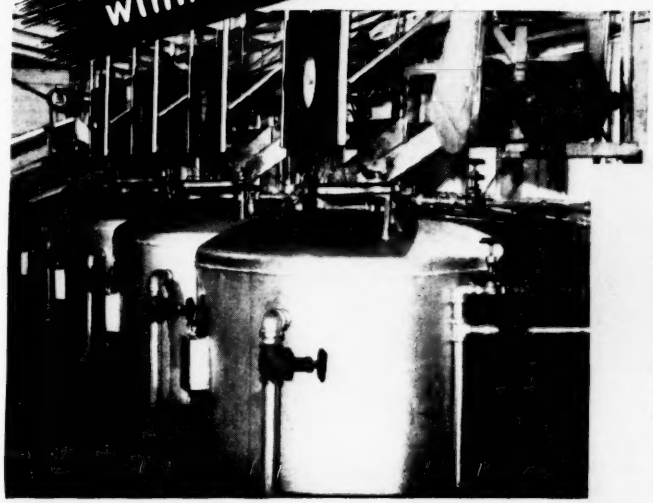
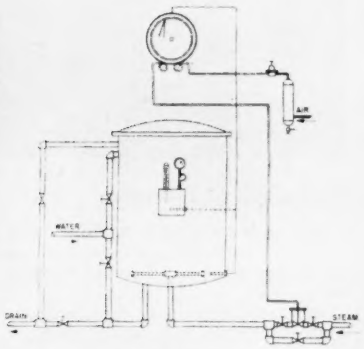


***DIAGRAM** shows typical set-up for Foxboro Retort Control described.*



NOTE:
Bulb location for water cook shown by solid line. Bulb location for steam cook shown by dotted line. For steam cook, water entrance to top of retort would be omitted.

Make the most of selected ingredients and top-notch processing formulas by equipping your retorts with Foxboro Automatic Control Systems. Through the accuracy and dependability of these systems, you can bring out the finest features of your products . . . cook after cook.

The control system shown here is specifically designed for processing small tin containers in steam or water without pressure cooling. It holds temperature accurately "on the beam" through entire cooking period . . . preventing over or under-cooking. Each cook is timed from the moment retort temperature reaches the required degree. At the end of cook, the control system automatically shuts off steam and signals operator . . . always according to a prescribed formula. Similar control without automatic timing also available.

Retort control, applied to its full capabilities, calls for more than instruments alone. It requires intimate knowledge of all types of packing and plant set-ups, plus expert application engineering. Through nearly 40 years of solving food plant problems, Foxboro engineers have acquired this important background. Use it to put your plant on a minimum-cost, maximum-quality basis. Write your nearby Foxboro Branch. **The Foxboro Company, 196 Neponset Avenue, Foxboro, Mass., U. S. A.**

SEE HOW CANNING OPERATIONS CAN BE MADE MORE EFFICIENT!

Get your copy of BULLETIN 414
48 pages of diagrams, illustrations, and descriptions of typical automatic control systems.

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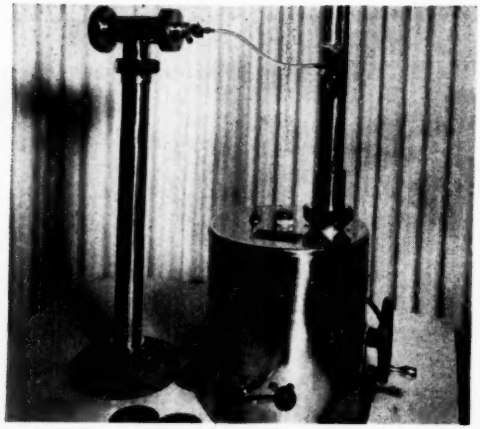
RECORDING · CONTROLLING · INDICATING
INSTRUMENTS

Food Equipment News



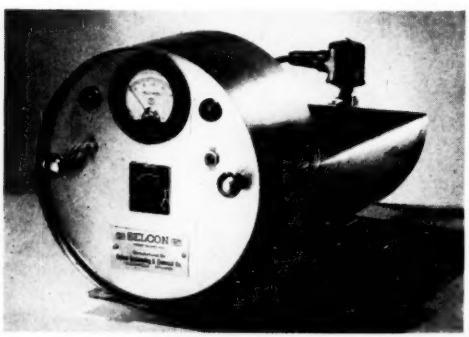
Continuous Milk Fortifier 1

Milk can be fortified with vitamin D continuously with a new Vit-O-Feeder, announced by Proportioneers, Inc., to be distributed by Klenzade Products, Inc., Dept. I, Beloit, Wis.

It injects an accurate predetermined amount of concentrate into the milk line previous to homogenization. Injection is accomplished through a capillary needle from which the concentrate is continuously "wiped" by the flow of milk.

Man-hours formerly necessary for this task are saved, and eliminated is the need of mixing vats or holding tanks. The equipment has ample capacity for an entire day's run, and it requires no operating attention.

All parts coming in contact with the concentrate are made of #303 stainless steel. Parts may be readily disassembled for cleaning. Installation is simple, requiring only a sanitary "T" in the milk line.



Wash Solution Control 2

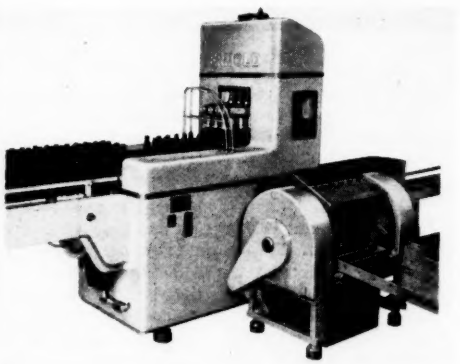
For automatically maintaining the correct wash solution strength in mechanical milk-can washers, the Selcon Engineering and Chemical Co., Dept. I, St. Paul, Minn., recently announced an electronic wash solution control.

This control feeds washing compound into the washer as needed to recharge the solution as rapidly as it is weakened by soil and rinse water.

The unit is sold outright for use with any detergent and on any commercial can washer. It is 10 in. wide x 23 in. long x 11 in. high, weighs 20 lb., and mounts on the top or side of the washer or on the wall. It is claimed that the control assures complete soil removal, a low bacteria count and permits thorough rinsing.

An indicator on the control panel provides a constant visual check on the condition of the wash solution and on the operation of the control. Adjustments make it possible to hold any desired solution strength for all conditions of soil and water hardness.

An electronic "brain" takes a continuous sampling of the solution and precision feeds the compound to keep the solution strength within close limits. To compensate for water-temperature changes, the control automatically varies the amount of compound fed to the washer. A compound storage compartment holds a normal day's supply of washing compound, and is designed to prevent caking, foaming and overflowing. Two pilot lights show when the unit is operating and feeding.



Automatic Case Unpacker and Dumper 3

Especially useful to bottlers, canneries, dairies and many other users of containers, a new automatic case unpacker and dumper has been developed by the Edward Ermold Co., Dept. I, New York City.

The new machine removes standard containers from cartons, deep or shallow cases, or trays. It also takes filled or partially-filled cases and discharges the containers onto a continuous conveyor in multiple rows. It discharges empty cases from either the right or the left side, depending upon requirements.

After initial settings are made the unit automatically refuses odd size or badly damaged cases, refuses cases containing overlength bottles, and leaves broken bottles in the case for discard. It accepts partially-filled cases, and the grippers have sufficient range to assure pickup of tilted or misaligned bottles.

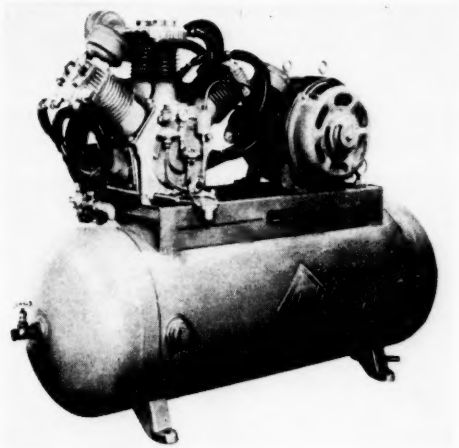
Speed is variable within a range of 4 to 15 cycles per min. Output equals the number of containers times the

cyclic rate. Quick changeover in a matter of minutes is a feature of the machine.

Controls are in easy-to-reach position on the case-discharge side of the machine, where all operational adjustments are grouped in a central panel. Safety devices, which are fully automatic, are designed to stop the machine with the grippers in retracted position.

The basic machine consists of the unpacker, with the case dumper available as auxiliary equipment. The dumper's function is to overturn empty cases in order to remove broken glass, bottle caps and other debris, after which it places the cases on a conveyor in an upright position.

The dumper can be operated by power take-off from the unpacker, or it can be independently powered as a separate unit. It can be used anywhere on the conveyor system.



Variable Size Air Compressor 4

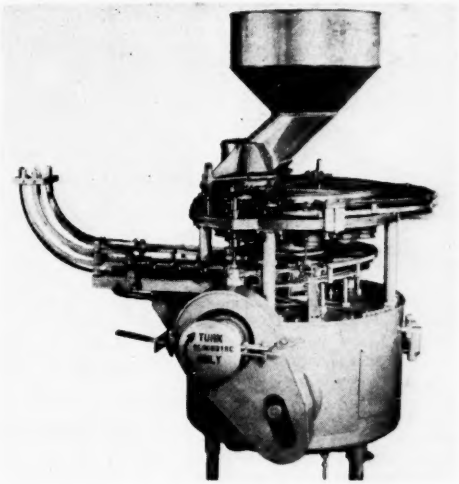
A compressor that can "grow" to meet expanding requirements for air has been announced by Air-Flo Compressor Co., Dept. I, Akron, Ohio.

This new basic unit, on which patent applications are pending, uses 18 principal parts to construct a line of 48 different models of 1, 2, 3, 4 or 6 cylinder pumps in single or two-stage types.

Manufacturer asserts that this represents the largest number of models ever made from one standardized set of parts. All parts are interchangeable from the smallest to the largest pump.

It is quite practical, for example, to purchase the size pump now needed and, as requirements expand, to buy additional parts to increase the unit's capacity (or pressure).

Compressors are available for prompt shipment in sizes from ½ to 40 hp. with 2.5 to 275 cfm. capacity at 30 to 300 lb. pressure in vertical, V type, or side angle construction, with single, twin, or radial staggered cylinder arrangements.



Fruit and Vegetable Fillers 5

Designed to handle sliced or cubed fruits and vegetables and granular products is a new filling machine designated as the FMC 101 Utility Filler. It is made by the Anderson-Barngrover Div. of Food Machinery & Chemical Corp., Dept. I., San Jose, Calif., which has completed a season of successful trial operations with the new unit.

The machine operates with Nos. 2½, 2, 303, or 1 Tall standard size cans at speeds ranging from 61 to 168 cans per min. Speed of the machine is controllable by a variable speed drive.

Features of the equipment include the no-can-no-fill device which automatically prevents discharge of the product whenever a can is not at the receiving end of a discharge pocket. Also there is a vibrating can track which causes the product to settle in the can as it is filled, eliminating plunger action and thereby reducing product damage.

Introduction of the product to the machine is accomplished via a large hopper mounted at the top of the filler. An oscillating plate located at the hopper base facilitates smooth and continuous flow of material from hopper onto a rotating plate containing eleven volumetric feed pockets. These pockets are easily adjustable as to amount of fill.

(Continued)

EASY WAY TO GET MORE INFORMATION — fill out coupon below, tear out and mail to Food Industries Reader Service.

Your Company Name_____

Address_____

Your Name_____

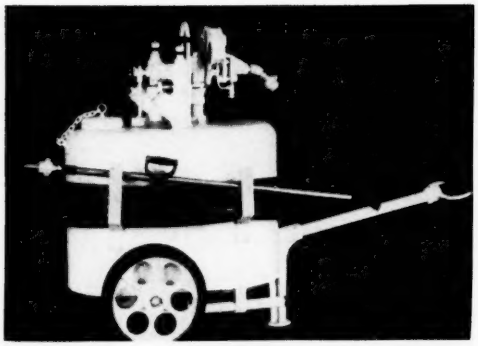
Your Title_____

To Reader Service Department, Food Industries
330 West 42nd St., New York 18, N. Y.

I would like to know more about the following items mentioned in February Food Equipment News:

(Print identifying numbers here)

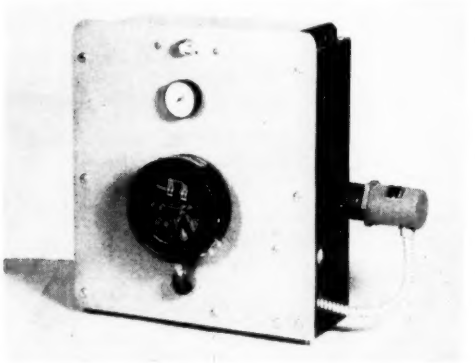
☐ ☐ ☐ ☐ ☐ ☐



Plant Cleaning Equipment 6

For fast and thorough cleaning of food plants and their equipment, Sellers Injector Corp., Dept. I, Phila., Pa., announces a new portable high pressure jet cleaner. The new machine is stated to remove slime, mold growths, and grease previously difficult to eradicate.

Portable and simply operated, the unit has a self contained 50-gal. tank for a detergent, and a 50-ft. pressure type hose and nozzle with operating controls for various cleaning jobs. Connections to a steam and a water line are required. There are no moving parts. High-pressure and high-temperature water discharges from the nozzle and, if desired, the jet is uniformly mixed with the desired amount of detergent. Jet pressure is adjustable up to approximately double the initial steam pressure. Both temperature and amount of detergent are adjustable.



Steam Return Line Treatment 7

For treating a steam system continuously over a long period of time, a new automatic unit is announced by Pressure-Jet Systems, Inc., Dept. I, Milwaukee.

Fluid, electrically heated in the unit, is atomized into the steam main beyond the boiler at high temperature and adjusted to the pressure of the steam system. Because its temperature is higher than that of the steam into which it is atomized, the fluid entrains with the steam, which carries it to all parts of the system.

The fluid is alkaline and noncaustic and will not injure ferrous or nonferrous metals, packings or gaskets. It neutralizes the acidity caused by oxygen and carbon dioxide, preventing the formation of carbonic acid.

Photoelectric Safeguard for Oil Flames 8

To give complete protection against the hazard of explosion caused by flame failure in industrial oil burner installations, Combustion Control Corp., Dept. I, Cambridge, Mass., announces a system for supervising both the pilot gas flame and the main oil flame of fully automatic oil burners.

The equipment consists of Electronic Flame Rod Type 45PP1, Photoelectric Scanner Type 45PH15, and Programming Control Type 24PJ8.

The flame rod "feels" the gas pilot flame. If the pilot flame has not come on, or is unsuitable for proper ignition, the flame rod signals this condition to the programming control and the burner shuts down before the main oil valve has even opened. With proper ignition, the main oil valve opens and the oil flame is then monitored by the scanner.

Compact in design, the photoelectric scanner is readily installed. Since the scanner contains both the phototube and amplifier tube, no special shielded cable is required between the scanner and programming control. The photoelectric system is designed to withstand conditions of relatively high ambient temperature and is impervious to ambient humidity.

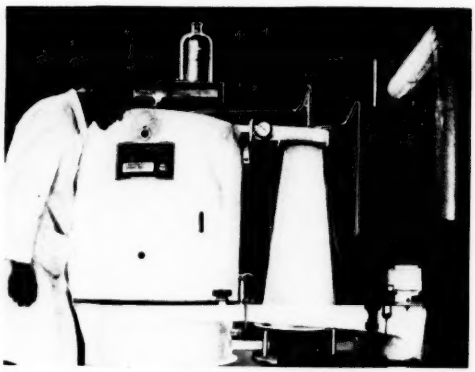


Table Model Laboratory Spray Dryer 9

For laboratory development work and small lot production, a new laboratory spray dryer is announced by Bowen Engineering Co., Dept. I, Garwood, N. J.

Retaining the desirable features of the company's original spray dryer, the new unit has additional features:

Greater range of inlet air temperature now provides operating air temperature up to 750 deg. F. This enables about 30 percent increase in evaporation rate of dryer.

Increased diameter feed pipe will handle viscous solutions or slurries and open fields for investigation that were previously possible only in large dryers. Stainless steel ducts are used between gas heater and drying chamber.

Included in the new model are easy-to-read dial thermometers which furnish both inlet and outlet temperatures of the gas, rubber plugs to seal cooling air inlets when desired, pilot light for gas burner in furnace, and new type rubber chamber base gasket for easier seating and cleaning.

The dryer is shipped complete with insulated gas furnace, temperature controls, insulated drying chamber with air driven floor sweeper, air turbine-driven spray machine, product collector and receiver jar, main fan and 2 hp. motor, connecting ducts, thermometers, and the table on which entire unit is mounted.

(Continued)

He's got the WORDS...We have the FACTS!

Yessir,
WEST TERAMINE
IS AMAZING!
STUPENDOUS!
TERRIFIC!
SUPER-
COLOSSAL!

WEST TERAMINE
Sanitizes...
deodorizes...
cleans...disinfects
Wets faster!
Penetrates further!
Economical...Safe!

WEST TERAMINE...

the powerful all-purpose germ-killer
for the FOOD INDUSTRY

Laboratory-Perfected

FOR EVERY FOOD INDUSTRY

MILK • BUTTER • CREAM • ICE CREAM • CHEESE
SUGAR • EGGS • FISH • MEAT PRODUCTS
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FOR EVERY NEED

PROCESSING EQUIPMENT • PACKING EQUIPMENT • REFRIGERATORS • TANKS • STORAGE BINS • FREEZING UNITS • TRUCKS • CONVEYORS
WALLS • FLOORS • WASHROOMS, etc.

Yes, without exaggeration, here's the many-in-one germ-killer you've been looking for! A quaternary ammonium compound that does most every cleaning job *better* and *faster*. West Teramine thoroughly sanitizes, cleans and disinfects all kinds of food equipment *without leaving an ODOR*. Does the same for walls, surfaces, floors and washrooms. Kills bacteria, molds and fungi *everywhere*.

IT'S "SURFACE-ACTIVE"

West Teramine is more powerful—has extra penetrating power because it's faster-wetting and "surface-active." More versatile—a slight change of dilution adapts it to any need. More economical—a little goes a very long way. In recommended dilutions, West Teramine is non-poisonous, tasteless, and won't irritate the skin.

PROVE IT FOR YOURSELF!

See Teramine in action! Learn why the entire food industry is sold on it. You'll be sold *too* after one demonstration.

Other WEST Products that Promote Better Food Industry Sanitation:

LIQUID SOAPS AND DISPENSERS • FLOOR MAINTENANCE • PROTECTIVE CREAMS AND PROTECTIVE APRONS • INSECTICIDES AND INSECTICIDAL EQUIPMENT • WASHROOM SANITATION • KOTEX VENDING MACHINES • and others.

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☐ Please send me a free sample of Teramine—*plus* booklet!
☐ Please arrange to have your representative demonstrate West products.

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Company.....
Address.....

DO YOUR SPRAYS CLOG?

Fig. 629

Here is a nozzle with a single round tangential inlet (instead of several small slots) which permits relatively large solid particles to pass right through and out the orifice. Produces fine breakup, even distribution, and hollow cone spray suitable for numerous applications.

Available in Brass, Stainless Steel and Hard Rubber or made to order in any machinable material. ¼" to 1" I.P.S.

Send Monarch an outline of your spray problem—if the liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

NOZZLES FOR:

- ATOMIZING
- AERATING
- COOLING
- HUMIDIFYING
- MOISTENING
- RINSING
- SPRAY DRYING
- WASHING

Do you have our Catalogs 6A and 6C?

MONARCH MFG. WORKS, INC.
2517 E. ONTARIO ST.
PHILADELPHIA 34, PA.

Direct Reading Balance 10

Rapid precision weighing is enabled by the use of a direct reading analytical balance offered by Fisher Scientific Co., Dept. I, Pittsburgh, and Eimer & Amend, Dept. I, New York City.

Known as the Gram-atic Balance, it has but one pan. All weighings are made under constant load. Weights are removed, not added, and this removal is by knob control, thus eliminating all direct handling of weights.

The complete final weight is read direct from the scales on the panel, and the last three decimal places are indicated automatically.

On every weighing, whether the sample is heavy or light, the load on the beam is always brought to 200g.—this being accomplished by removing of weights equal to that of the sample. These weights are indicated on the direct reading scale as they are removed. The uniform loading produces a constant sensitivity regardless of the weight of the sample. It also permits the final beam deflection to be transposed to milligrams.

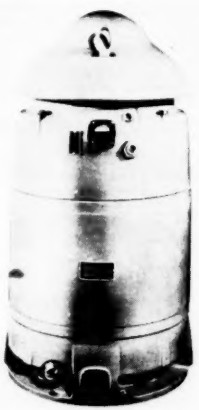
As weights up to 0.1g. are removed by means of control knobs, their corresponding figures appear on the direct reading scales. The weight less than 0.1g. is indicated optically and automatically upon the illuminated screen.

Portable Crane 11

Three new portable cranes have been announced by Grand Specialties Co., Dept. I, Chicago 22. No. 1-C, with a lift up to 7 ft., and No. 2-C with a lift up to 8 ft. 6 in., have a capacity of 3,000 lb., while No. 7-C, with a maximum lift of 10 ft. 8 in., is guaranteed for 4000 lb. lift, but has been tested to 7000 lb. without any fractures to material or winch. No. 1-C weighs 350 lb., 2-C 365 lb., and 7-C 480 lb.

These cranes are easy to move about. Safety winch crank is turned in clockwise direction to lift load. When operator stops to turn crank, load is held in that position. If load is lowered, crank is turned counter-clockwise. Winch is of sufficient strength to carry maximum load on a single cable line with one man at crank.

On Model 7-C, boom can be extended to 79 in. When folded down it is 48 in. from ground. It fits under 6 ft. opening through 32 in. width doorway, and it moves on roller rubber tired wheels. Boom and winch, weighing 185 lb., can be removed from wheel carriage by removing one bolt. No. 7-C may be supplied in hydraulically-operated model with extra reach and lift capacities.



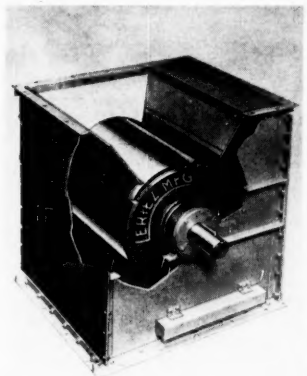
Vertical Pump Motor 12

Applicable to practically all types of turbine pumps, a new development in deep well vertical pump motors is announced by U. S. Electrical Motors, Inc., Dept. I, Los Angeles.

Completely streamlined, the new motor has an interchangeable base to permit increase or decrease in hp. without the expense of re-machining or exchanging the pump head. A waterproof housing protects vital parts of the motor from injurious weather conditions. Downdraft ventilation prevents re-entry of expelled hot air by blasting the air for approximately five diameters away from the motor.

The Flushtyle oil gages are made with Lucite windows, giving full visibility to the oil supply. The lubrication system permits thorough flushing out of all devitalized grease by forcing clean grease through each bearing. Gravity-fed oil flow assures the correct oil supply.

An adjustable hollowshaft makes it possible to precisely adjust the impellers of a deep well turbine pump. This also permits the heavy thrust bearing to be placed in the top of the motor, and it eliminates the necessity of using a flexible coupling to connect the motor to the pump shaft.



Magnetic Drum 13

Requiring no electric current to produce a magnetic field, a completely self-energized magnetic drum is announced by the Eriez Mfg. Co., Dept. I, Erie, Pa.

Powered by Alnico magnets, the unit is adaptable for the automatic removal of tramp iron and fine ferrous contamination where materials are conveyed in spouts, chutes and other similar conveying systems not employing belts.

Drum separators consist of a revolving cylindrical shell within which a stationary high-powered permanent non-electric magnet is located. The magnet covers about half the cross sectional area of the drum.

Material is fed onto the drum shell. Non-magnetic material is discharged first and separately, while the magnetically susceptible portion is held against the shell until it passed out of the magnetic field.

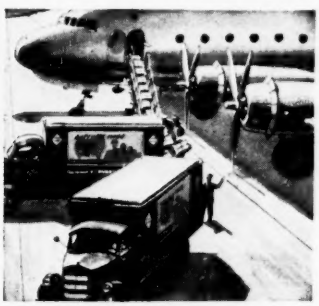
The unit is available in 18 different sizes, including 12, 18, and 24 in. dia., and in drum widths up to 50 in. The drum may be ordered as a separate unit or complete with housing.

(Continued)

$5.07 saved a contract ...and a man's business

Special switches were needed to complete an electrical instrument contract. Late delivery of finished items would kill chances of future orders and lay off men. Switches were 1100 miles away, but Air Express delivered the 15-lb. package at 3 A.M. — 8 hours after pick-up. Cost, only $5.07. Air Express now used regularly. Keeps down inventory, improves customer service by early delivery.

Low as $5.07 was, remember Air Express rate *included* door-to-door service, receipt for shipment and more protection. It's the world's fastest shipping service that *every* business uses with profit.



World's finest Scheduled Airline fleet carries Air Express. 24-hour service — speeds up to 5 miles a minute. Direct to over 1000 airport cities; air-rail for 22,000 off-airline offices.

FACTS on low Air Express rates:

17-lb. carton of hearing aids goes 900 miles for $4.70.
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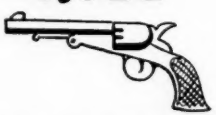

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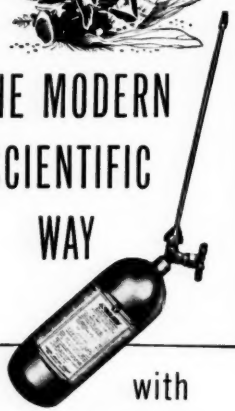

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Lethalaire V-20 kills insects, from cockroaches to silverfish . . . does it scientifically, economically, effectively . . . without waste, without the labor and messiness of hand-spraying. It does not contain DDT. It will not contaminate food. Lethalize with Lethalaire. See your supplier today, or mail the coupon for further interesting information.

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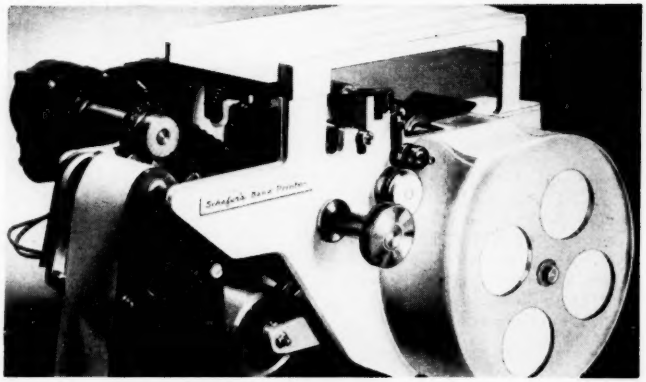


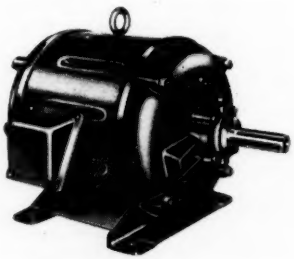
Band Printer 14

Introduced in Detroit by Schafer's Bakery Products Co. is a new machine which automatically prints bands as they go around bread while wrapping.

Precision made, it is a self-contained unit which fastens on present wrapping machines. It prints an up-to-date sales message on a specially waxed one-side band, dries the ink, and applies the band to the package—all in one operation.

Unit is reported to run for long periods without attention from the wrapping-machine operator. Plate changes and wash-up of press are stated to require but a few minutes each day. All working parts are protected from dust and other foreign materials, and are easily accessible. Special odorless, instant-drying inks are used.

The band printer can be employed to "code" your products by printing the bands either with different color inks each day or special code marks.



Drip-Proof Motors 15

Adoption of the same design for its polyphase motors in the 254, 284, 324 and 326 frames as is used in the company's drip-proof motors in frames 225 and smaller is announced by Wagner Electric Corp., Dept. I, St. Louis.

Motor frames of the new design are almost exactly like those of their prototypes, differing from them only in the omission of all ventilating openings.

They are formed of heavy rolled steel, shaped to accurately center the stator core and to provide passages between the frame and the core for ventilation.

An auxiliary fan, larger in dia. than the armature of the motor, draws in air through the openings in the front endplates, forces it through these passages, and out through the endplate openings on the drive end. Heat is effectively carried off from all parts of the motor.

Screens on the endplate openings give added protection by preventing rags, paper, or similar matter, from being drawn into the motor, and they also prevent the entrance of rodents and other small animals.

Both sleeve-bearing and ball-bearing motors of the new design are stated to be completely drip-proof when mounted in the normal horizontal position, and, when the endplates have been correctly rotated, these motors are reported still drip-proof in the sidewall or ceiling horizontal positions because they have no openings in the frames. The illustration shows 5-hp. ball bearing motor in the 254 frame.

Dairy Thermometer 16

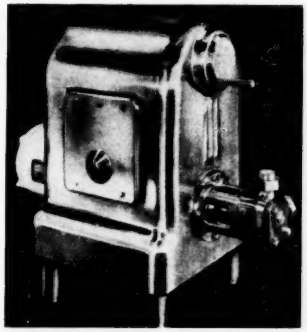
A new dairy recording thermometer is announced by The Bristol Co., Dept. I, Waterbury, Conn. It operates on the same basic vapor-tension system used in the dairy thermometers long built by the company.

Housed in a newly developed modern case, it incorporates many design improvements that make it easier to use and more convenient to service.

The case can be mounted on a wall or flush on a panel, and the user can

easily change from one type of mounting to another. A heavy inlaid sponge rubber gasket on the door keeps the working parts of the instrument free of moisture.

Silver soldering of all connections, heavy flexible stainless steel armor, and the coiled capillary construction at the bulb head are features incorporated to prevent breakage during daily cleanings. Corrosion-resistant, sanitary construction has been employed.



Sanitary Rotary Pump 17

Announcement of a positive rotary pump of sanitary type is made by Cherry-Burrell Corp., Dept. I, New York City. Known as the Meterflo Pump, it is designed to give long service with minimum wear.

Construction is of stainless metals that will not influence flavor. No copper bearing alloys are used. A built-in adjustment compensates for wear between rotor and head.

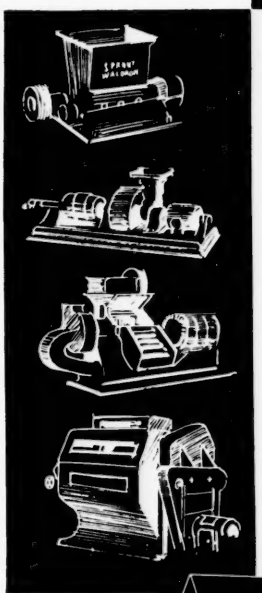
Sloped surfaces and rounded corners make cleaning easy. Also, there are no threads in the product zone, and no splines in the milk. Bottom of the pump casing is enclosed to meet 3A standards. Pump is elevated off the floor on sanitary, adjustable legs.

Internal parts of the pump head may be assembled and disassembled without tools. Pump has one shaft, one rotary seal.

Stainless Steel Truck 18

A heavy duty, 1,200-lb.-capacity stainless steel truck has been added to the three smaller models manufactured by The Standard Casing Co., Inc., Dept. I, New York City.

The inside of the truck measures 48 in. long, 30 in. wide, and 24 in. deep. Inside surfaces are of seamless construction for reasons of sanitation and easy clean-up. Truck is equipped with threaded drain-hole. Neoprene, roller-bearing wheels are mounted on unit.



GRANULATING, pulverizing, defiberizing, crushing, or cutting—whatever you call it, **if it's size reduction,** Sprout-Waldron can help you.

Reduction of cocoa cake . . . corn for meal or distillers' grits . . . wheat for flour . . . citrus waste for feed—these are typical applications in which Sprout-Waldron experience and equipment have been outstanding.

Every day S-W Engineers are transforming new and varied size reduction problems into more profitable operations. Whether your processing calls for the usual or the unusual approach, first learn what Sprout-Waldron can do for you!

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69A

A quick way to starch and iron!

How could any starch be easier to use than Quick Elastic Liquid Starch?* You just pour . . . add water . . . and use. It's as simple as that.

Of course, the wide mouth on this bottle helps make pouring easy . . . and then there's the free spinning screw cap. Not an ordinary screw cap, mind you, but a Crown Screw Cap. The only screw cap that has the patented Deep Hook Thread. It seals securely and dependably without side-wedging or binding.

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When you're talking closures . . . talk to Crown. Our 50 years of accumulated knowledge of scientific sealing methods is available to any manufacturer to help him get maximum efficiency from his closures. Crown Cork & Seal Co., Baltimore 3, Md. *World's Largest Makers of Metal Closures.*

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Catalogs, Bulletins

This digest of manufacturers' publications is for the information of executives, superintendents, packaging men, food technologists and purchasing agents. To get copies of this new literature conveniently, fill out the coupon below, tear out and mail to Food Industries Reader Service.

Food Plant Equipment

Sectional Conveyors 51

For bottles, jars, cans and cartons, a new sectional conveyor line is described in 4-page bulletin. Keyed drawing points out features. Price list is attached.—*Horne Machinery Co., Inc.*

Vertical Mixers 52

Offered in capacity drives of 50, 100 and 150 cu. ft., new model "VA" mixers are shown with specifications, construction details and photographs in 4-page Bulletin VA-948.—*Sprout, Waldron & Co.*

Exhauster and Conveyor System 53

"Walking beam" conveyor system and its use with universal exhauster, reported to save up to 50 percent in floor space, is covered with illustrations and capacity table in 4-page bulletin, punched for notebook.—*United Welding & Mfg. Co.*

Ice Cream Hardening 54

Use of the Votator in ice cream hardening is covered in 4-page bulletin. Fully automatic apparatus comprises three parts: Loading and unloading device; continuous holding conveyor, with carriers, speed control and drive; and refrigerating system. Capacity is fixed by package size. Diagram shows installation.—*The Girdler Corp., Votator Div.*

Roller Top Dollies 55

Single-page bulletin gives specifications of roller top dollies for pallet handling. Included is illustration of dollies in use.—*Island Equipment Corp.*

Switchgear and Control Devices 56

Broad line of switchgear and control devices is covered in 16-page illustrated Bulletin 25B-7095. Data are given on types and ratings, and standard wiring diagrams are included.—*Allis-Chalmers.*

Storage Racks 57

For increasing the actual capacity of available storage space, new barrel and drum racks are detailed in 16-page Bulletin 4873. Installation views show how overhead space can be utilized and floor space more efficiently used with the arc-welded steel racks.—*Barrett-Cravens Co.*

Liquid-Filling Machines 58

Specification chart for capacities of various automatic and semi-automatic liquid-filling equipment is given in 4-page bulletin. Dimensions of equipment are given.—*MRM Company, Inc.*

Small-Size Packages 59

For packaging small quantities of such products as cocoa, soup mix, and gelatine, in individual size packets, open-end envelopes are presented by *Brown Bag Filling Co., Inc.*

Steam Generators 60

Forced recirculation steam generators, completely self-contained and requiring only a fraction of the water necessary in conventional systems, are offered by 8-page 4-color bulletin. Generators are available in 10, 15, 30, 50, 75, 100 hp. for working presures up to 150 psi.—*Clayton Mfg. Co.*

Vacuum Pasteurizer 61

Batch pasteurizing under vacuum for dairy products is recommended in 10-page Bulletin 42C. Cutaway view of stainless steel pasteurizer shows control valves, agitator, insulation, and all working parts.—*Jensen Machinery Co., Inc.*

Plate Heat Exchanger 62

Blueprint drawings, dimension tables and photographs in 8-page bulletin give data on new "Model HM" plate heat exchanger. Unit is totally enclosed. It is of stainless steel construction.—*York Corporation.*

Packaging Casebook 63

Wide range of stapling and wire stitching jobs that can be done with fastening machines is pictured and discussed in 12-page booklet.—*Bostitch.*

Wire Screens 64

For sugar refining and malting industries, wire screens of two surface types, flat and riffle, are presented in 4-page bulletin.—*Cambridge Wire Cloth Co.*

High Intensity Magnets 65

For removal of harmful tramp iron, Permaplate magnets can be installed in any part of a processing line. Three types, from 4-72 in. in size, are offered in 4-page Bulletin B-1205A.—*Dings Magnetic Separator Co.*

Evaporators for Dairy Products 66

Condensed or evaporated milk, ice cream mix, or dried milk can be made at lower operating cost with multiple-effect evaporators and vapor milk heaters, states 24-page Bulletin 343. Many photographs illustrate equipment, and schematic flowsheet shows operation.—*Buflovak Equipment Div., Blaw-Knox Co.*

Ice-Making Machine 67

Unit to eliminate costly and wasteful crushing or shaving of block ice is the Paklcer which makes crystalline ice. It is described in Bulletin 806, which offers photographs and text covering its uses in the dairy, produce, fishing and meat industries. Five models are shown.—*The Vilter Mfg. Co.*

Plug Valves 68

Dimensions, photographs and line drawings of many types of lubricated plug valves are given in 32-page Catalog No. 4. Price lists and directions for installing and servicing are included.—*American Car & Foundry Co.*

Centrifugal Pumps for Acids 69

Pumps for handling acids and acid slurries, made of high-silicon cast iron, are described with photographs, dimension tables, and text in 8-page Bulletin W-350-B2E.—*Worthington Pump & Machinery Corp.*

Wrapping Machines 70

Equipment for more efficient packaging and for problem packaging is detailed in 4-page bulletin, which gives illustrations of machines already developed.—*Package Machinery Co.*

Brewery Coolers 71

Use of multi-tube coolers for hot wort cooling, as well as cellar cooling, is discussed in 4-page bulletin. Photographs and a cross-section drawing illustrate construction.—*Enzinger Union Corp.*

Centrifugal Pumps 72

Designed exclusively for handling of corrosive solutions, Model 40 Series M centrifugal pumps are available in twelve alloys, with all parts interchangeable. Bulletin 815 describes in 20 pages, with photographs and drawings, construction and accessories of pumps.—*The Duriron Co., Inc.*

Wirebound Box Closer 73

Intended for packers of fruits, vegetables, meats and poultry, is new wirebound box closing machine, delineated in 4-page bulletin. Five step, 6-sec. closing cycle is shown in various stages.—*J. H. Platt & Son.*

Single-Control Valve 74

Hydromatic single-control valve, powered by the raw water itself, is presented for use on Zeolite softeners and pressure filters. Cutaway view, capacity, and general discussion is

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ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • VANILLA • FLAVOR BASES

given in 8-page Bulletin No. 4460.—*Cochrane Corp.*

Labeling and Casing Equipment **75**

Labeling machines, casers, feed tables and elevators are described, with pictures, dimensions, and capacities, in two 12-page Catalogs 1165 and 1187.—*Chisholm-Ryder Co. of Pennsylvania.*

Agitator Kettles **76**

Stainless-steel, steam-jacketed, twin-shaft agitator kettles, designed for heavy mixing, are pictured and described in 4-page Bulletin AK-1. Primary shaft has speed of 30-35 rpm., and secondary mixer 80-100 rpm. Kettles are also available for light-medium-heavy mixing operations.—*Groen Mfg. Co.*

High-Vacuum Processing **77**

Application of vacuum in freeze drying, self drying, evaporators and condensers is covered in 20-page Catalog 49-C. Many installations are pictured, and dimensions and capacities of equipment given.—*F. J. Stokes Machine Co.*

Pump and Heater Sets **78**

Complete line of duplex pump and heater sets are described, with diagrammatic layouts and photos, in 4-page Bulletin 150. Factors to be considered in specifying are discussed. —*Peabody Engineering Corp.*

Valve Reference Section **79**

General catalog data, descriptions, specifications and prices on "Self-Sealed" lubricated plug valves are given in 4-page Section 5 of Book 39.—*Homestead Valve Mfg. Co., Inc.*

Platform Trucks **80**

Three models of floor trucks—Freighter, Warehouser and Handy Andy—are shown in photographs and described in specification tables and cut-away views in Bulletin TR-848. Three types of wheels are illustrattd, also interlocking corner pocket.—*Rapids-Standard Co.*

Tubular Heat Exchangers **81**

A complete line of heaters, coolers, condensers and heat exchangers is presented, with illustrations of units and details of design, tubing characteristic and thermal resistance tables, in 32-page Bulletin 916.—*Griscom-Russell Co.*

Conveyor Systems **82**

"Make Ceilings Pay Dividends" is new 28-page publication showing different applications and flexibility of overhead trolley conveyors. Book gives ideas for mechanized handling, coordination of plant operations, and straight line production.—*Link-Belt Co.*

Control Equipment

Dairy Thermometers **83**

For recording the pasteurizing, sterilizing, cooling and holding temperatures in milk pasteurization, 6-page Bulletin T837 offers dairy thermometers with vapor tension systems.—*The Bristol Co.*

Moisture Meter **84**

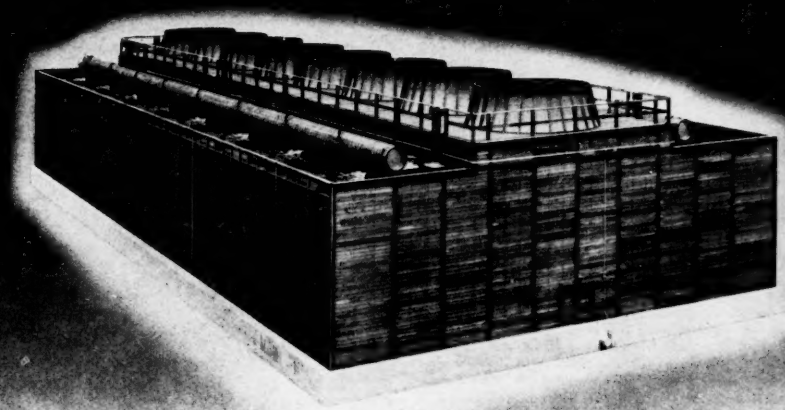
Direct reading in moisture content percent and automatic temperature compensation are two features of moisture meter described in new single sheet bulletin.—*Hart-Moisture-Meters.*

Conductivity and pH **85**

Fundamentals of measurement of pH and conductivity, photographs of installations, and schematic drawings showing instrumentation, are included in 44-page Catalog 15-12.—*Brown*

(Continued)

Specify MARLEY Double-Flow



WITH THE OPEN DISTRIBUTION SYSTEM

Marley Double-Flow Cooling Towers have an Open Distribution System.

And why is that important?

Because the Marley Open Distribution System is . . .

EASY TO INSPECT . . . it's on top of the tower, in broad daylight, never hidden from view.

EASY TO REGULATE . . . a widely varying GPM may be circulated over the tower without revamping the distribution system.

EASY TO CLEAN . . . cleaning is done with an ordinary broom . . . it is not necessary to shut down the tower or take it apart in any way.

UNUSUALLY SAFE . . . no climbing through small portholes, across slippery members . . . no danger of falling through the filling while crawling about in narrow spaces in semi-darkness while inspecting or cleaning.

VERY ECONOMICAL . . . because it's easy to clean . . . and clean distribution systems insure top performance and low operating costs. Also, the diffusion decking underneath gives excellent water break-up with no added pumping head.

Ask for a MARLEY Factory-Trained APPLICATION ENGINEER to tell you more about the MARLEY DOUBLE-FLOW Cooling Tower with the Open Distribution System. He'll be glad to help you [illegible]

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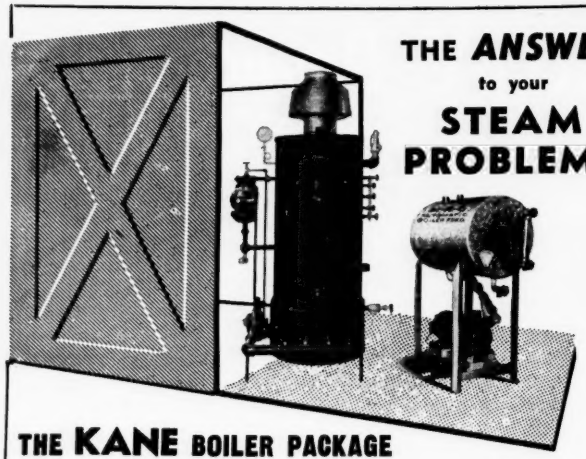
THE MARLEY COMPANY, INC. • KANSAS CITY 15, KANSAS



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Engineered Steam at its best, with four decades of experience at your disposal—so, send your steam problems to us for study and recommendation.

The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

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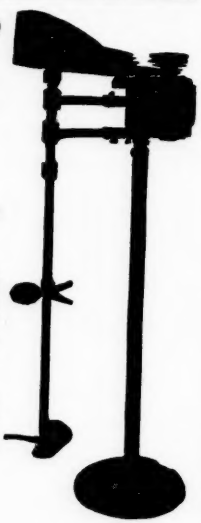
New! TERRISS 3-SPEED
PORTABLE MIXER

STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.



The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

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Instrument Co., Div. of Minneapolis-Honeywell Regulator Co.

Pressure Gages 86

Bronze or steel spring-actuated pressure gages for vacuum, standard or high pressures are covered in 4-page folder. Ranges and spring materials are given for four models.—*Clapp Instrument Co.*

Plant Supplies

Compression Sprayer 87

Portable CO_2 pressure sprayer for dispensing insecticides, fungicides or whitewash without need for hand-pumping, is described in 4-page color bulletin. Three-gallon capacity sprayer is illustrated and described.—*R. E. Chapin Mfg. Works, Inc.*

Bottle Labeling 88

"Successful Bottle Labeling," handy 36-page booklet, discusses many facets of labeling problems, methods, and choice of adhesives.—*National Adhesives.*

Multi-wall Bags 89

Paper multi-wall bags, protect products from moisture, mildew, and contamination, are described in 8-page catalog. These kraft paper bags are available with sewn or pasted valve and sewn or pasted open mouth.—*Hammond Bag Paper Co.*

Ice Cream Making 90

Krageleen, vegetables stabilizer for ice cream, is described—what it is and what it does—in 16-page book, "Hot Tips on a Cold Subject." Tables and formulas for improving ice cream are given.—*Kraft Foods Co.*

Pipe Insulation 91

Flexible insulation with self-adhesive edges for insuring dry piping on refrigeration lines and air ducts is detailed in 4-page folder.—*Mystik Adhesive Products.*

Miscellaneous

Buttermilk Manufacturing 92

The making of buttermilk is comprehensively covered, from cultures and bulk starter to bottling and storage, in 10-page book, "The Manufacture of Quality Buttermilk." Reasons for various defects in finished products are given, and commercial practices are described.—*Meyer-Blanke Co.*

Model Milk Plant 93

Modern advancements that make various savings possible in milk plant operation are reviewed in 12-page bulletin. Ideas are presented for savings in milk, man-hours, and money by farsighted planning.—*Cherry-Burrell Corp.*

Laboratory Glassware 94

New items and price revisions on complete line of laboratory glassware are presented in Supplement A of Catalog LP 28.—*Corning Glass Works.*

S. S. Sheets and Plates 95

Chemical analysis, gages, sizes and tolerances for chrome-nickel grades of stainless steel are given in 6-page accordion.—*Eastern Stainless Steel Corp.*

Certified Milk Standards 96

New edition of "Methods and Standards for the Production of Certified Milk" has been released, covering laboratory standards, buildings and equipment, transportation and distribution, and recommendations for the dairy.—*The American Association of Medical Milk Commissions, Inc.*

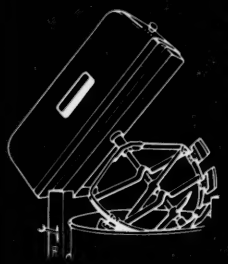
The New HAMILTON *White Master* "MIX-COOKERS"!

Finest of all KETTLES WITH THE HAMILTON NAME.

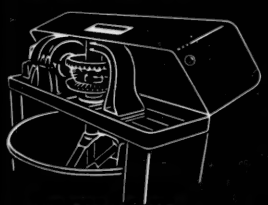
SMOOTH UNBROKEN surfaces of Stainless Steel and white enamel won't collect splash and drip and dirt.

Stainless Steel with either stationary or tilting kettle bowls, every one an A.S.M.E. Code kettle. Built to be the finest mix-cooking equipment that can be bought . . . at a price that makes it easy to buy.

This new heavy-duty "Mix-Cooker" establishes a new standard in sure sanitation.



Self-contained BEAM LIFT. No connections of any kind. No hoist needed overhead.



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Self-lubricating "OILITE" BEARINGS on all Agitators.

CAPACITIES from 30 to 500 gallons.

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NATURE'S BOUNTIFUL HARVEST of fresh vegetables and fruits is brimming with taste-tingling juice and endowed with Ascorbic Acid (vitamin C). Consumers actually rely on vegetable juice cocktails, tomato or fruit juices to maintain their vitamin C intake. Because of differences between products from different soils, plant varieties and climates, you should standardize the vitamin C content of your pack, and at the same time overcome processing losses of this valuable vitamin. Capitalize on consumer interest in juices of high nutritional value. You, too, can Keep Faith with Nature.

It is in the public interest to standardize the vitamin C content of these juices:

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- Vegetable Blends
- Pineapple
- Apple • Grape
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STORAGE

Storage of Frozen Foods

A temperature of 0 deg. F. is adequate for the storage of most frozen foods. However, for some commodities, or for periods of a year or more, −10 or −15 F. is preferable. Temperatures above 0 F. are not satisfactory.

Georgia-grown fruits and vegetables were freshly harvested, blanched and frozen on stainless steel plates at −15 deg. F., then stored in individual cabinets maintained at various temperatures between −15 and +15 F. Raw fruits and cooked vegetables were scored by a panel. Firmness was measured by a tenderometer; leakage by thawing in a funnel for 24 hr. at 35 deg. F.; and color with a Lovibond tintometer.

There was a continual loss of natural appearance, color, aroma and flavor when asparagus, snap beans, corn, strawberries, blackberries, raspberries and peaches were held for 1 yr. or more. All except snap beans lost up to 50 percent firmness and increased in leakage. Those products stored at −15 F. or lower were scored higher at each examination than those stored at higher or fluctuating temperatures. Vegetables such as asparagus or snap beans, in which texture is important, were more sensitive to high storage temperatures than was corn. Peaches were more sensitive to loss of color, flavor and aroma at higher storage temperatures than were the more highly colored and flavorsome berries.

Digest from "Effect of Storage Temperature on Frozen Foods," by J. G. Woodroff and Ethyl Shelor, *Refrigerating Engineering*, 514-17, 550, Dec. 1948.

FERMENTATION

Yeast From Food Wastes

Pilot-plant operations have indicated the practicality of producing yeast from fruit and vegetable processing wastes. Two independent continuous pilot plant operations—one using citrus-peel liquor and the other using juice from pear waste—are described. Effective aeration furnished by the mechanical air dispersing system with which the yeast propagator in the pear-waste plant is equipped, and the exact maintenance of a constant pH near the optimum point by means of instrument control, result in unusually large yeast output. The wort and ammonia feed is regulated by a pH controller.

Digest from "The Production of Yeast From Agricultural Wastes," a paper by W. D. Ramage and J. H. Thompson, presented at Yeast Symposium, Milwaukee, Wis., Nov. 8-10,1948.

Higher Output of Yeast

Increased yield of yeast from fermentable glucids is claimed for a French process recently patented in the U. S. In the prior art it has been customary to carry yeast proliferation in each of three successive breedings to the point of complete disappearance of glucids in each case. After all fermentable glucids in the first breeding have disappeared, yeast is extracted and wholly used in the second breeding —and likewise in the second and third breedings, after which yeast is extracted for further use. Yields by this process are from 130 to 150 kg. of pressed yeast of 72 percent moisture for 100 kg. of glucids available in the breeding medium.

According to the present invention, yeast is periodically extracted from the breeding medium before the glucids have completely disappeared, and the liquid thus freed is used for a new growth. The number of successive uses is not limited and may be more than four. Only a fraction of the extracted yeast from each breeding is restored to the medium, with added nutrient elements if necessary.

The process is continued as long as the yeast crop is deemed profitable, and at least until all glucids have disappeared. The yield by this procedure is claimed to be 300 kg. of pressed yeast of 72 percent moisture per 100 kg. of glucids in the medium.

Digest from U. S. Patent 2,446,737, issued Aug. 10, 1948, on an application dated May 16, 1945, to Firmin Boinot, Melle, and Jean Boige, La Noblette-Melle, France, and assigned to Les Usines de Melle (Societe Anonyme), Saint-Leger-les-Melle, France.

DAIRY

Lipase Inactivation

Time required at any temperature to prevent the lipolysis induced by homogenization of raw milk varies with the rate of heating to, and cooling from, the holding temperature.

Raw milk was homogenized at 105 deg. F., heated to various temperatures within 5 sec. after homogenization, held for various lengths of time, then rapidly cooled. Data obtained were plotted in a time-temperature relationship for the inactivation of lipase. As in the case of phosphatase, inactivation temperature is a straight line function of log temperature, but the slope of the lipase curve is greater than that of phosphatase.

As the temperature is lowered, lipase is inactivated with progressively less time of exposure than is phosphatase. When milk was heated at the rate of 5 deg. per min., instantaneous exposure at 142 deg. F. was sufficient to inactivate the enzyme, while heating within 5 sec. required a temperature of 185 deg. to obtain inactivation with instantaneous exposure.

Digest from "Effect of High-Temperature Short-Time Heat Treatments on Some Properties of Milk. II. Inactivation of the Lipase Enzyme," by J. H. Hetrick and P. H. Tracy, JOURNAL OF DAIRY SCIENCE, 881-87, Oct. 1948.

Frozen Cottage Cheese

Cottage cheese which upon thawing after freezing will have the desirable texture and body of fresh cheese is the object of a recently patented process. Here, the inventors found that cheese which is tough and slightly rubbery to the point where it is unpalatable will, upon being frozen and thawed, assume the texture and body of fresh

(Continued)

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cheese, and will not have the chalky, crumbly body of ordinary frozen cheese.

Crux of the process is exact control of acidity in the manufacturing process. It is essential to limit whey acidity at the time of cutting to 0.45 percent and possibly as low as 0.35 percent. After the curd is cut, it is cooked in the ordinary manner, except that time and temperature are controlled to obtain the desired toughness and rubbery character.

Digest from U. S. Patent 2,446,550, issued Aug. 10, 1948, on an application dated Oct. 4, 1944, to Gerald C. North and Lawrence Little, Chicago, and assigned to Beatrice Creamery Co., Chicago.

FATS AND OILS

Mustard and Rapeseed Oils

Oils pressed from rapeseed grown in Western Canada, and oils from mustard seeds screened from wheat, are dark-colored and unattractive. They are not suitable for food uses, though their saponification numbers, free fatty acid, and iodine numbers are similar to those of corn, peanut, sesame and other edible oils.

By conventional alkali refining methods, followed by a 20 min. bleach at 212 deg. F. with clays, refined oils similar in color to the usual salad oils were obtained. Oils refined by first washing repeatedly with water to remove lecithin, or treated with sufficient alkali to reduce the free fatty acid to that of refined oil, could also be bleached, but less efficiently than the conventional alkali-refined oil. Crude oils could also be bleached fairly well at 382 deg. F., but the free fatty acids are increased by so doing.

Oils alkali-refined with 10 deg. Be. Na OH, bleached for 20 min. at 212 deg. F. with 2-4 percent Super-filtrol, and deodorized at 464 deg. F. for 1 hr., were lighter in color and more viscous than corn oil. They were clear at 40 deg. F. and had smoke points of over 400 deg. F. For salad oil usage, mayonnaise, or pastry, they were as acceptable as corn oil. When fresh the rapeseed and mustard seed oils were not as good as corn oil for doughnut frying, but on aging or re-use the difference was no longer apparent.

Digest from, "Canadian Erucic Acid Oils I. Refining and Bleaching" by N. H. Grace, and "Canadian Erucic Acid Oils II. Edible Use of Rape and Mustard Seed Oils" by H. J. Lips, N. H. Grace and Elinor M. Hamilton, CANADIAN JOURNAL OF RESEARCH, Vol. 26F, 349-65, Sept. 1948.

Improved Nut Butters

Stabilization of nut butters to retain full-bodied flavor is the object of a recently patented process. For ex-

(Continued)

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ample, in peanut butter, which ordinarily loses an appreciable amount of flavor in the roasting operation, the flavor carrier is restored to the comminuted mass at any stage subsequent to the roasting step.

In the case of oil-deficient peanuts, oil is added to the comminuted mass, together with the water used to carry the flavor into the finished product. And if non-fattening peanut butter is desired, water alone is added to the ground mass to restore the flavor solvent. A preservative may be added in the course of manufacture. In the event that all the oil has not been removed from the butter, the flavor carrier is preferably combined with an antioxidant or a dineric interface modifier, such as a monoglyceride ester of a fatty acid, to prevent undue catalytic action between the oil and water.

The flavor carrier may be introduced alone or in the form of an emulsion whose polar nature alters the solid-liquid phases of the butter to a stable plastic mass in which no gravital separation will occur.

A modified process of preparing nut butters in which the flavors have been rendered accessible and stabilized makes use of sonic, supersonic, or ultrasonic vibrations for mechanically dispersing, emulsifying, or colloidally suspending the flavor solvent or carrier in the finished product.

Digest from U. S. Patent 2,447,387, issued Aug. 17, 1948, on an application dated May 3, 1943, to Fizhugh L. Avera, Laguna Beach, and Joseph L. Rosefield, Oakland, Calif., said Avera assignor to said Rosefield.

MEAT AND FISH

Salt-Cured Herring

The British salt-cured herring industry, due to shortages of materials and skilled labor, decided to modernize its methods and procedures. This involved the development of mechanical methods of preparing the herring for treatment; curing and storage in vats or tanks instead of the traditional barrels of certain kinds of wood; and finally inspection, grading, and packing in attractive and convenient containers for the consumer.

A catch of herring was divided into three lots. One was "nobbed" (head and gut removal) by machine; another was "gibbed" (gills and gut removal) by hand in the usual manner; and the third was left in the "round" or ungutted state. Each of these three groups was further divided into three lots. One was packed into barrel with salt; a second was salted and shoveled into an enameled bath containing brine; and the third was similarly prepared and shoveled into a wooden vat

(Continued)

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containing brine. All lots were cured and stored outdoors for months before testing by a panel.

Judges agreed that there was no detectable difference between the "wood" and "non-wood" cures. "Round" fish were less satisfactory than either "gibbed" or "nobbed" fish, and would not be acceptable in most markets. No difference was detected between the lots cured in barrels and those in vats or baths. Lacquered tins showed visible signs of corrosion only after 6 months. On the whole, the experiment indicated that the industry could easily be established on modern food-factory lines.

Digest from "Recent Experiments in the Salt Curing of Herrings," by J. M. Shewan, *Food Manufacture*, Vol. 23, 465-69, Oct. 1, 1948.

Freshness of Oysters

In following changes in the degree of freshness of shucked Eastern oysters, pH is a useful index and should have some value in indicating quality when used with other tests.

Tests made on oysters from 10 Eastern states showed that practically all commercially shucked oysters had an initial pH above 6.2. During storage, the pH decreased gradually as the oysters became less fresh. At the time the off odor was first noticed it varied from 5.96-5.65. The bulk of the samples remained in good condition for from 10 days to 2 weeks.

Digest from "Some Data on pH and Freshness of Shucked Eastern Oysters," by S. R. Pottinger, *Commercial Fisheries Review*, Vol. 10, No. 9, 1-3, Sept. 1948.

FRUITS AND VEGETABLES

Tomato Composition Affected by Sunlight

Tomatoes grown under glass are poorer in ascorbic acid but richer in sugar and superior in flavor to the same varieties grown in open fields. This is attributed to the difference in illumination of the growing environments.

Similar variations have been observed in field-grown tomatoes in England during 1944-'46, when there were considerable differences in the hours of sunshine during the growing season. In 1947, however, the sunshine hours were abnormally high without there being an appreciable increase in ascorbic acid over previous years. This suggests that increased illumination is not effective above a certain level, and can be modified or offset by other growing conditions.

Significant differences exist between the principal varieties of English tomatoes in sugar (2.51-3.06 percent in-

(Continued)

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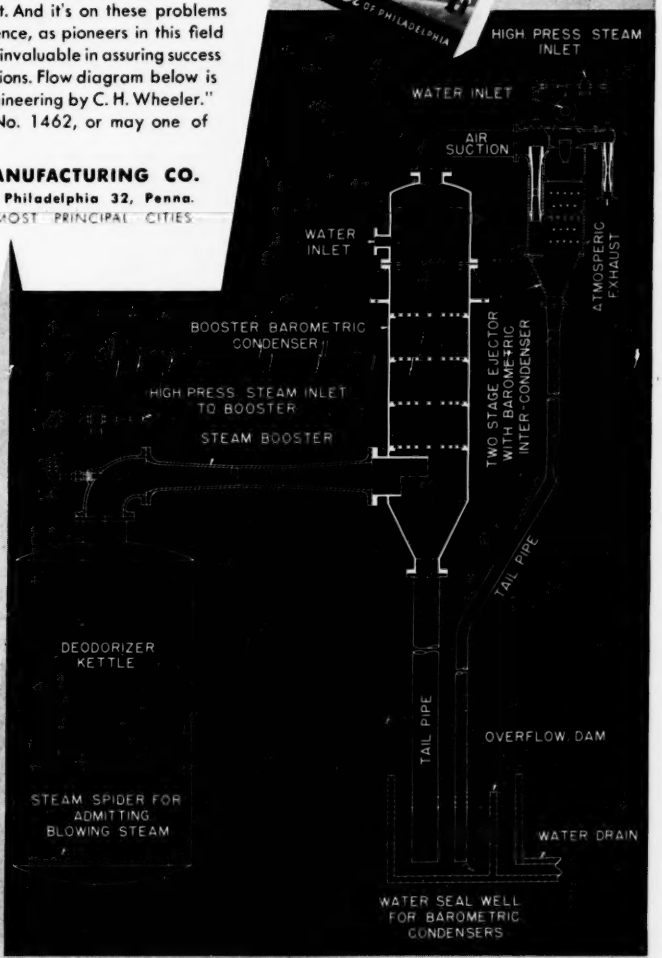

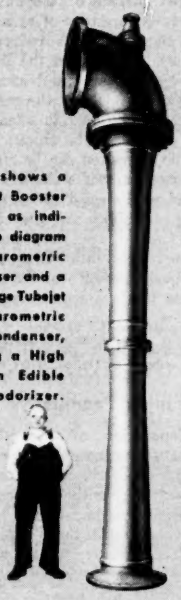

Photo shows a Tubejet Booster Ejector, as indicated in diagram with Barometric Condenser and a Two Stage Tubejet with Barometric Inter-Condenser, serving a High Vacuum Edible Oil Deodorizer.

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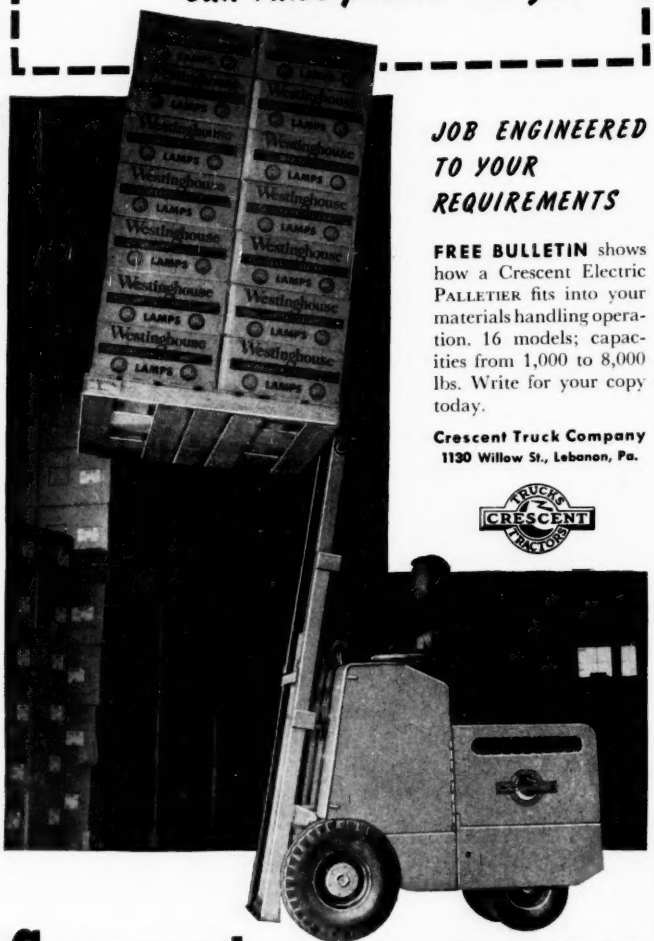

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vert sugar), free acid (43.2-56.5 ml. of N/10 acid per 100g.), and in ascorbic acid (21.5-26.3 mg. per 100g.). Ascorbic acid in American tomatoes is higher than these figures show, 40 mg. per 100 g. being the figure usually quoted. Analyses show that ascorbic acid in tomatoes grown in Continental Europe is also higher than for those grown in England, the more favorable growing conditions being responsible for the differences.

Digest from "Factors Influencing the Composition of the Tomato," JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY, Vol. 67, 281-82, July 1948.

ENGINEERING

Onion Peeler

Apparatus for peeling onions by means of a jet of compressed air or steam has recently been patented. The onions are prepared by cutting off the top sprout and root ends so that the skin layers at both top and bottom are severed. The onion is then brought beneath the discharge end of a gas nozzle, with one of the cut surfaces directly facing the nozzle.

Gas issues from the nozzle in a conical, diverging, hollow jet across curved surface of the onion, causing a reduced pressure at or near its largest diameter. This reduced pressure loosens the skin on the line where it has been severed and causes it to be drawn outward into the gas stream and ultimately inflated, thus tearing it from the surface of the onion.

The operation can be made continuous by means of a chain conveyor provided with spaced spikes on which the capped onions are placed. Conveyor and nozzle are so related that the onions pass into the gas jet in the proper position for removal of the skins.

Digest from U. S. Patent 2,445,881, issued July 27, 1948, on an application dated Dec. 18, 1945, to George T. Hemmeter, Berkeley, Calif., and assigned to United States of America.

Cleaning Peanuts

Separation of harvested peanuts from their accompanying debris can, it is reported, be accomplished by means of recently patented apparatus. Pneumatic separation is used initially to remove the light refuse, and secondarily to segregate the peanuts themselves from the heavy debris. Finally, the nuts are graded as to size by screens.

The process is continuous. Run-of-field nuts are fed onto a reciprocating screen that allows fine dirt and sand to pass. The feeder discharges onto the screen through an updraft of air

(Continued)

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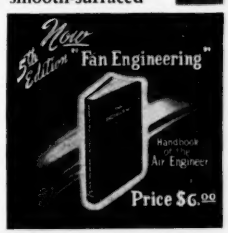

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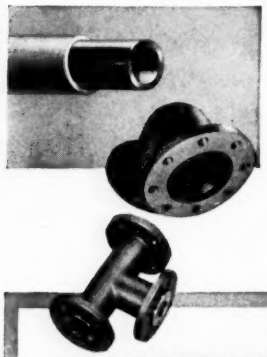

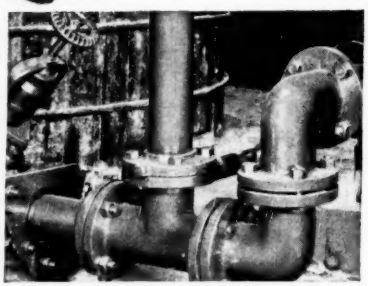

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that removes light refuse such as hulls and sticks. Flowing from the end of the screen, the nuts meet an upward current of air of sufficient suction to lift the nuts away from heavier refuse, such as stones, and deposit them in a hopper. From this point, the nuts flow over a series of screens that deliver graded sizes as final products.

Digest from U. S. Patent 2,449,007, issued Sept. 7, 1948, on an application dated Nov. 2, 1944, to F. J. Paul, Fredonia, N. Y., and assigned to Huntley Mfg. Co., Brocton, N. Y.

MICROBIOLOGY

Organisms in Fountain Syrups Controlled by Acetic Acid

In a recent study, a comparison was made of the inhibiting properties of acetic, lactic and citric acids in strawberry juice-syrup and raspberry juice-syrup mixtures against *Saccharomyces cerevisiae* and *Aspergillus niger*. Acetic acid was more effective against mold than it was against yeast—only 0.19 percent being necessary to inhibit mold growth in both syrups. To prevent yeast growth, 0.33 percent acetic acid was required. Yeast growth was prevented in both syrups by adding 6.20 percent citric acid; 7.75 percent failed to prevent mold growth, however. Yeast and mold growths were inhibited in both syrups by the addition of 6.25 percent lactic acid.

As a practical check, raspberry syrup with addition of 0.33 percent acetic acid was exposed to room temperature in an open container under conditions which would produce spoilage. No spoilage was observed after three months of exposure.

Digest from "The Toxicity of Certain Organic Acids to Yeast and Mold in the Presence of Fruit Juice-Syrup Mixtures," by R. E. Morse, C. R. Fellers and A. S. Levine, *Journal of Milk and Food Technology*, 346-51, Nov.-Dec. 1948.

MISCELLANEOUS

Flavor Suspensions

Improved means of maintaining the flavor of beverages in suspension is the subject of a recent patent. The inventor uses an extraction of a marine alga, *Iridophycus flaccidum*, which he claims is superior to the commonly used Irish moss.

The new agent has uniform suspending powers regardless of the time of year or place of harvest, and a sirup to which it has been added may be cooled as rapidly as one containing no suspension agent. In fact, the cooling process may be omitted, and sirup containing the new suspending agent may

(Continued)

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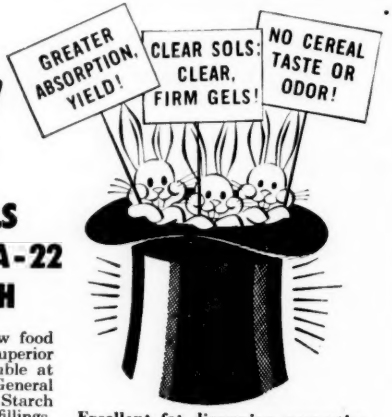
***New* MODIFIED A-22 WHEAT STARCH**



It's no trick to discover how food manufacturers can produce superior food products with less trouble at lower cost. Merely by using General Mills A-22 Modified Wheat Starch in their salad dressings, pie fillings, ice cream cones, candies, dessert mixes and soups.

No wonder this amazing wheat starch is finding such favor with the trade. Look at a few of the qualities of A-22!

No cereal taste or odor—the natural flavor of your food product is not obscured.

Greater absorption and thickening power—more water absorbing and water holding than other food starches. Use less, get better results.

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be packaged as soon as the agent has been added to it. Furthermore, the marine alga mentioned yields from 60 to 80 percent extractive solids, as against 40 percent for Irish moss.

The finished sirup, chocolate or other flavor, may be mixed with cold milk, according to taste, and the flavored milk may be pasteurized in the usual manner without affecting flavor or viscosity. The flavor remains in nearly perfect suspension.

Digest from U. S. Patent 2,448,599, issued Sept. 7, 1948, on an application dated Feb. 17, 1945, to K. W. Karnopp, Waukegan, Ill., and assigned to The Kalva Corp., Waukegan.

Packing Kale in Ice

Comparative tests have been made of the effect of packing fresh kale in chipped ice for six days, and holding it at room temperature for the same period. Spoilage, weight loss, ascorbic acid and moisture content, and palatability of the iced and un-iced kale were determined at intervals throughout the six-day test.

Spoilage amounted to more than 50 percent of the un-iced lot, and less than 20 percent of the iced. Ascorbic acid content of the edible portion of the un-iced kale dropped 44 percent on the average, as against 14 percent for iced lot. Packing is chipped ice was as satisfactory as storage in the hydrator of a mechanical refrigerator, and much better than in the refrigerator outside the hydrator.

The tests indicate that all concerned would profit by packing kale in chipped ice during transit, storage, and marketing, and that the additional cost would be more than offset by reduction in spoilage.

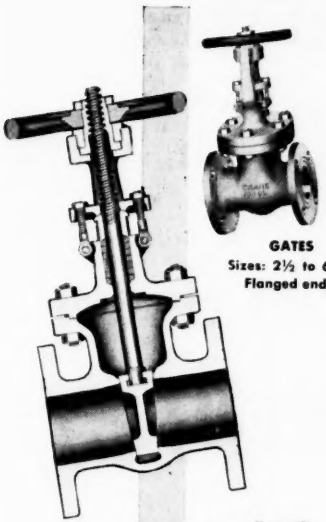
Digest from "Effect of Chipped Ice Packing on Fresh Kale Preservation," by M. Potgieter and C. Cowell, REFRIGERATING ENGINEERING, Vol. 56, 399-401 and 421, Nov. 1948.

New Sugar Refining Process

Cost of refining sugar can be greatly reduced and vitamins, now largely wasted, can be salvaged by a new process (now in the experimental stage) in which contaminants are washed from the raw sugar with wood alcohol. The expensive melting of sugar, purification over animal char, evaporation and recrystallization are all eliminated by the process, which makes practically 100 percent pure white sugar at the point of origin. Vitamins, now lost in refining, are saved in the new process. These are retained in a residual molasses of pleasant flavor which would be particularly valuable for direct human use.

Digest from a paper by A. H. Luley and D. F. Othmer, presented before Div. of Ind. and Eng. Chemistry, ACS. St. Louis, Mo., Sept. 8, 1948.

See these new CRANE Corrosion-resistant valves



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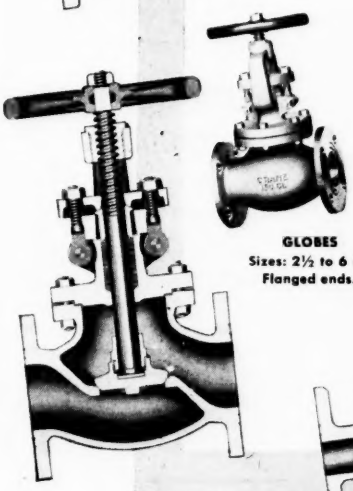

GLOBES
Sizes: 2½ to 6 in.
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NEW SWING CHECKS
Sizes: ½ to 2 in. Flanged or screwed ends.
Also straightway flow pattern in sizes 2½ to 6 in.

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Working Pressure: 150 pounds, liquid or gas

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In developing these valves, Crane engineers have overlooked nothing—in materials or mechanical design—that would assure the most positive performance, economical operation, and ease of maintenance. Rugged construction provides greater safety for the operator and contributes substantially to longer valve life, even under severe corrosive conditions.

Take your choice of materials. All parts in contact with flow are either Crane Quality 18-8 Mo or Monel—materials produced under the most rigid control. See these valves—the best buy in their class—at your local Crane Branch, or **ask for Catalog No. 320,** describing Crane corrosion-resistant piping materials.

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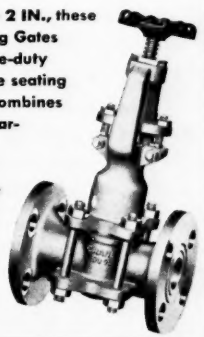

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Books

More Refrigeration

REFRIGERATION AND AIR CONDITIONING. *By Richard C. Jordan and Gayle B. Priester. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York City 11, 1948. 512 pages; 6¼x9¼ in. Cloth. Price, $7.75.*

Designed as a comprehensive treatment of the twin subjects to which the title refers, this book will serve as a ready reference for the food plant engineer.

Early chapters discuss the history of refrigeration, the various cycles and processes (analyzed in later chapters), and give a review of thermodynamics. The final chapter is reserved for the latest applications of refrigeration for frozen foods. In practically all cases, descriptive material on equipment follows closely after the presentation of theory to which the equipment relates.

Dr. Jordan has been teaching at the University of Minnesota since 1936, becoming a full professor in 1946. Mr. Priester is a former associate professor in mechanical engineering at Case Institute of Technology.

Business Systems

TECHNIQUE OF SYSTEMS AND PROCEDURES. *By H. John Ross. Published by Office Research Institute, Inc., 60 East 42nd St., New York City 17, 1948. 341 pages; 7x9½ in.; cloth. Price, $15.*

Up to now, systematic procedure studies have generally stopped at the factory. This book attempts to bring these studies to the whole industrial activity, carrying through from the factory to the front office.

Among the subjects treated are: How to make a clerical survey; analyzing clerical operations; interviewing technics; getting cooperation; making process and procedure charts; designing, elimination and controlling forms; making a manual; selling improvements; motion analysis; and how to rate yourself.

The book is printed in a Varitype face. Incidentally, it attempts the simplified writing style of the *Art of Plain Talk*. But do not let this discourage you—its a good book to have around, though rather expensive.

Cuban Sugar

SUGAR . . . FACTS AND FIGURES. *Published by United States Sugar Council, 136 Front St., New York City 5, 1948. 159 pages; 6¼x9 in.; cloth. No charge.*

Cuban sugar has had a see-saw battle for recognition as a major item of U. S. trade in peacetime. In both world wars, Cuban producers were urged to produce to the limit as the only hope of averting a U. S. sugar famine. But between 1919 and World War II, they were stymied by either tariffs or quotas, with seemingly little regard for the economic effects of such restrictions on the island republic.

The whole story of sugar—particularly Cuban sugar—is set forth in this interesting handbook, from its history to its mutual economic importance in U. S.-Cuban trade. Filled with tables and charts that explain the text, the book is well worth the reading by all industrial users of this important commodity.

Milling Reports

ASSOCIATION OF OPERATIVE MILLERS—TECHNICAL BULLETINS. *Printed and published by Sosland Press, Inc., Kansas City, Mo., 1948, 422 pp, 5½x8¾, cloth, Price, $3.50.*

Technical reports presented at district and national meetings from 1920-1937 have been compiled into permant form by the Association of Operative Millers. They are the reports that have materially contributed to production knowledge in the milling industry and have thus been considered of sufficient value to warrant previous publication in technical bulletin form.

Various phases of milling technics are covered, and use is made of graphs and charts to supplement text information. In some instances line drawings are used to emphasize design details.

The papers are presented in chronological order, and complete author and subject indexes are included.

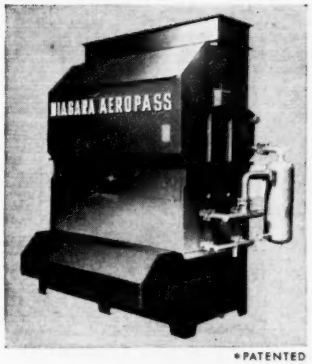
This is the first of several proposed volumes. Publication of Volume II to cover the period since 1937, is expected within the coming year.

Government Publications

MOISTURE RESISTANCE OF PACKAGES FOR DRIED-EGG POWDER. *By Earl C. Myers and J. O. Bixby. Forest Products Laboratory, No. R1725. Available only from Forest Products Laboratory, Madison 5, Wis.* A resume of research on packaging materials for dried-egg containers ranging from 5-oz. to large fiber drum or wooden barrel packages.

UNION WAGES AND HOURS: THE BAKING INDUSTRY, JULY 1, 1947. *Bureau of Labor Statistics Bulletin No. 936. Price 20c.* A resume for important cities showing in great detail the labor

(Continued)



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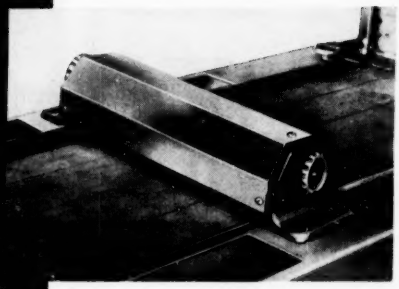

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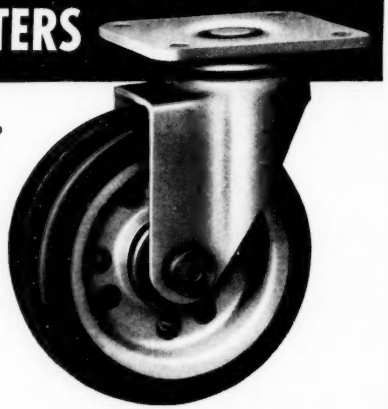

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schedules for every class of bakery worker. Not fully up to date, but still very significant in analyzing relative wages for different classes of employees.

Preparation and Use of Leaf Meals from Vegetable Wastes. *By J. J. Willaman and Roderick K. Eskew. Department of Agriculture Technical Bulletin No. 958. Price 35c.* A discussion of practical factory methods, including recommended flowsheet and equipment as well as elaborate studies of feeding value as determined by factory methods used.

Capacity of Cold Storage Warehouses. *By A. S. Walker and M. R. Banks. U. S. Department of Agriculture, Marketing Facilities Branch.* Latest available survey of the United States. The 14th of a series of biennial reports dealing with conditions as of Oct. Details are given for geographic areas and for types of storage.

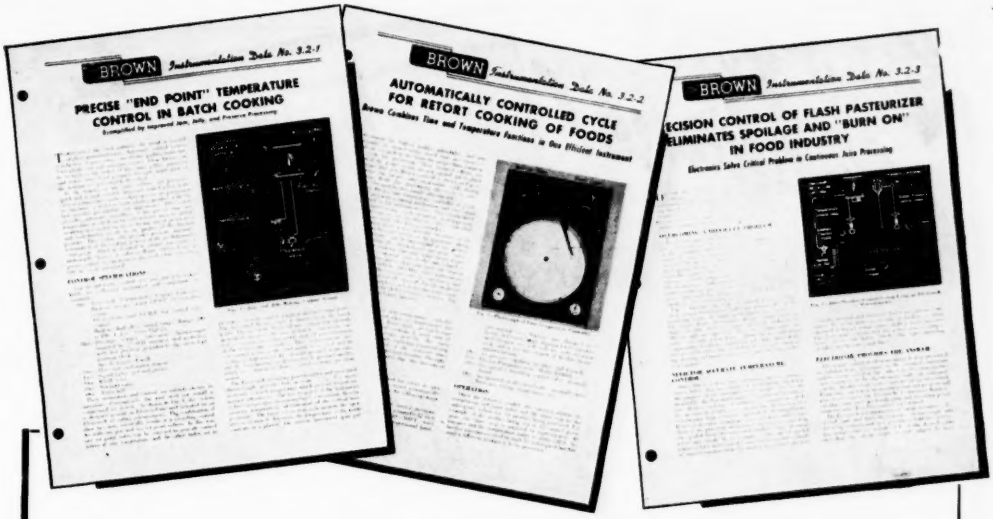
Interpretations of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act. *U. S. Department of Agriculture, Service & Regulatory Announcements No. 167.* Gives a comprehensive resume which governs application of the Act to all classes of chemical materials whether for use in agriculture or in industrial establishments.

Marketing Florida Citrus Summary of 1947-48 Season. *By H. F. Willson.* Special Production & Marketing Administration report prepared in cooperation with Florida State Marketing Bureau by investigators at the Lakeland, Fla., station.

Know the Eggs You Buy. A colored chart issued by the U. S. Department of Agriculture as a popular market guide.

Uniformity of Quality of Beet Sugars. *Bureau of Agricultural & Industrial Chemistry, AIC-193. Mimeographed. Available from Southern Regional Research Laboratory, New Orleans, La.* No. XXVII of series, this work contains chemical and physical studies on the beet sugars of the 1947 campaign and biological studies of the 1947 beet sugars.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.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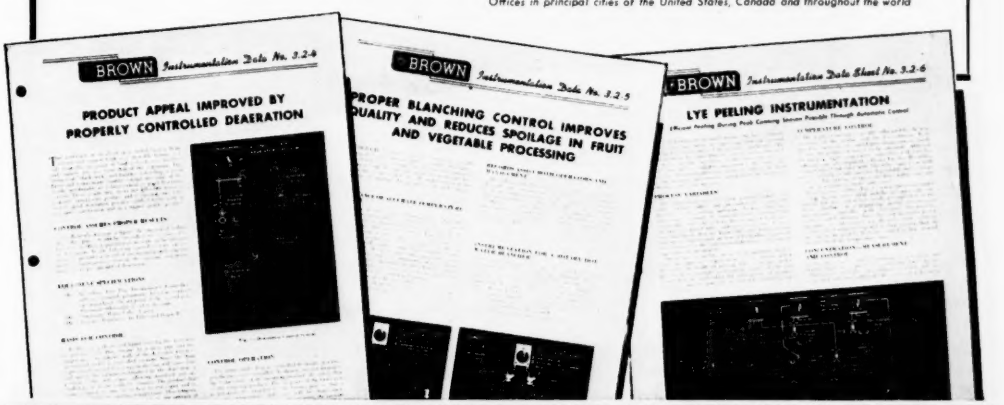
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Patents

Cooked Fish Treated With Non-Toxic Edible Alkali Before Sterilization in Package to Inhibit Development of Undesirable Flavor During Sterilization—L. B. Sjoström, Wakefield, Mass. to Arthur D. Little, Inc. Cambridge, Mass. No. 2,446,889. Aug. 10, 1948.

Fruit and Vegetable Combination Grinder and Dryer Equipped With Sub-Dividing Beater, Source of Supply of Drying Air and Screen Wall Portion for Separation of Fines—O. W. Randolph, Toledo, Ohio. No. 2,446,952. Aug. 10, 1948.

Soya Meal Combined With Undigested Activated Sewage Sludge and Alkali Metal Hydroxide for Formation of Adhesive—D. V. Redfern to Adhesive Products Co., Seattle. No. 2,446,954. Aug. 10, 1948.

Niacin Made by Heating 3-Cyano-Pyridine in Presence of Water and Organic Amine—H. R. Rosenberg, to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,446,957. Aug. 10, 1948.

Peanuts Graded for Size and Freed from Field Debris by Gravity Separation in Pneumatic Draft—Frederick J. Paul, Fredonia, N. Y., to Huntley Mfg. Co., Brocton, N. Y. No. 2,449,007. Sept. 7, 1948.

Storage-Stable Sterile Solution of Riboflavin Citrate Made by Use of Propylene Glycol Solvent—Sidney D. Upham, Pearl River, N. Y., to American Cyanamid Co., New York City. No. 2,449,041. Sept. 7, 1948.

Whey, Sugar and Yeast Mixture Subjected to Three-Step Fermentation to Obtain Desired Flavor; Decanted; Liquid Held at Freezing Temperature to Obtain Proof—Emmet R. Engel, Berwyn, Ill. No. 2,449,064. Sept. 14, 1948.

Cane Sugar Clarification Mud Extracted With Organic Solvent for Recovery of Hard Dark-Colored Wax From Which Light-Colored Wax is Prepared by Subsequent Solvent Treatment—C. B. Broeg and R. T. Balch, Houma, La., to United States. No. 2,449,107. Sept. 14, 1948.

Skim Milk and Whey Containing Nutrient Salts Fermented With Clostridium Acetobutylicum to Synthesize Riboflavin—H. L. Pollard, N. E. Rodgers and R. E. Meade, Appleton, Wis., to Western Condensing Co., San Francisco, Calif. Nos. 2,449,140; 2,449,141; 2,449,142; 2,449,143; and 2,449,144. Sept. 14, 1948.

Fruit Mechanically Graded by Use of Endless Conveyor—McSherry Lupton, Winchester, Va. No. 2,449,611. Sept. 21, 1948.

Fruit Sliced and Cored in Machine Equipped With Turntable Carrying Operating Units and to Which Dump Plate is Hinged Providing for Discharge of Cuttings Over Periphery of Turntable—Edward W. Bridge, Philadelphia. No. 2,449,737. Sept. 21, 1948.

Jelly Rolls and Like Made by Mechanical Means—Morris Cohen to Interstate Bakeries Corp., Kansas City, Mo. No. 2,450,033. Sept. 28, 1948.

Fruit Juices Containing Peel Oil and Acid Constituents Boiled in Closed Container Under Vacuum to Vaporize Oil and Acid Constituents Preliminary to Their Removal by Condensing and Filtering Condensate—Gray Singleton, Lakeland, Fla. No. 2,450,097. Sept. 28, 1948.

Bread and Other Bakery Doughs in Pans Automatically Fed Into Oven—Robert L. Brosemer, Sacramento, Calif. No. 2,450,111. Sept. 28, 1948.

Stabilized Wheat Germ Preparation Made to Contain Small Proportion of Milk-Solids-Not-Fat and Large Proportion of Wheat Germ on Solids Weight Basis and Stabilized Against Oxidative Deterioration by Heating to at Least 200 Deg. F. While in Dispersed State—Max P. Cryns, Kansas City, Mo., to Ira Milton Jones, Milwaukee, Wis. No. 2,450,123. Sept. 28, 1948.

Flour Subjected to Action of SO_2 in Presence of Steam to Increase Moisture Content and Control Gluten Strength—Herbert H. Ward, Grange-Over-Sands, England. No. 2,450,260. Sept. 28, 1948.

Canner's Waste Vegetable Material Ground to Give Slurry Consistency With Natural Moisture Content, Fermented to Produce 1-2 Percent Lactic Acid Content and Concentrated to ½ to ⅓ of Original Volume Under Vacuum With Retention of Original Characteristics, Including Carotene Content—William Peter Martin Grelck, Baltimore, Md., one-half to Linn J. Firestone, Arlington, Va. No. 2,450,335. Sept. 28, 1948.

Printed copies of patents are obtainable at a cost of 25¢ each, directly from U. S. Patent Office, Washington, D. C.

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—*Continued from page 73*

in Cuba. The small difference in retail price here is compensated for by what is commonly called a "larger yield" by the cook using American packed tomatoes.

Having no organized quality production of vegetables, the Cuban tinner has to confine his production to Cuban fruits, but even these are scarce and prices have reached unheard of heights during recent years. Tinners of meats, sausages, and the like, are idle about six to eight months in the year for lack of raw materials. Meat has been absent from the table of the average Cuban for weeks on end during the past eight years. The writer has visited meat packers who have been at a standstill for months, notwithstanding their strong demands and protests before the Cuban government.

Another factor is the domestic labor situation. Basing their demands on the high cost of living, laborers have obtained one increase in salary after another. But the production rate has not gone up.

Lack of modern equipment and modern production methods is still another factor that is keeping the domestic food producer out of the race. And, last but not least, is the well known fact that limited production considerably increases the cost of production. This is a problem that confronts most industries in Cuba. How could we have mass production of biscuits, crackers, and other such products, with a population of only 5,000,000 and with processing facilities comprising only small plants—more than one hundred of them—scattered over all the Cuban territory?

As a result, you can now buy in Cuba a package of U. S. cookies at a price which is lower—even after paying transportation and duty charges—than is asked for domestic cookies. This is true even though the quality of the ingredients in the domestic cookies is inferior to those in cookies made in the States.

Spend Millions

Cuba is spending at the rate of $300,000,000 for American foods every year. A large percentage of this figure is represented by American processed foods. The figure, impressive in itself, should mean something to the alert manufacturers in America. Moreover, while Cuba enjoys, at present, an unusually prosperous situation, we understand that Mexico, Brazil, Venezuela and most other Latin American countries have their own share of prosperity, too.

There is a large demand now in Cuba for all sorts of tinned, ready-to-serve foods—such as fruits, soups, vegetables, meats, fish, juices, sausages, children's prepared foods. Sizes of the packages are more or less the same as in the United States.

Most Cubans are well acquainted with the quality brands whose advertising appears in American magazines. These brands are readily identified by prospective buyers who see them on the shelves of Cuba's modern "American Groceries," which are now springing up in most busy streets of Havana. The name of the brand, therefore, should be kept in its original English on the labels. Instructions on how to prepare and serve the food should be written in both English and Spanish.

—End—

Gaging Leakage

—Continued from page 105

means is at least three times its standard error, this difference is considered to be significant.

Proposed Test Method

Preparation of Sample: Three individual samples of a size sufficient to be considered representative (50 to 100g.) are weighed out immediately prior to freezing. These samples are then frozen by the method that is being investigated. They are then sealed in individual packages and are stored at a pre-determined temperature and for a length of time dependent upon the nature of the tests being conducted. By preparing samples in this manner, it will be possible to determine the effect on leakage of the various factors involved in the preservation of food by freezing.

Determination of Leakage: At the time that it is desired to determine the leakage from the prepared samples, they are removed from storage and placed in a single layer in liter beakers containing 200 ml. of mineral spirits previously saturated with water (a quantity sufficient to cover the sample) in a room maintained at a temperature of 68 ± 1 deg. F. One hour after the temperature of the samples has reached 68 deg. F. (a total of 4-hr. for strawberries and peach slices stored at 0 deg. F.), the samples are removed from the beakers, rolled on two paper towels in succession, and weighed. The difference between the original weight of the sample and this final weight is leakage, and should be reported in terms of leakage per 100g., or percent.

If three samples are run for each determination, the mean of the three is reported. When this method is ap-

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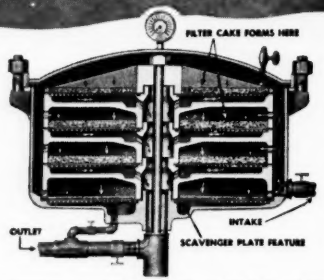

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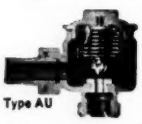
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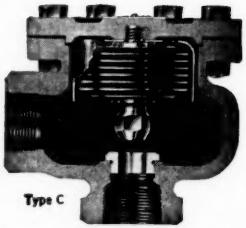
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plied, some indication should be made of the reproducibility by running a larger series of similar samples and determining the mean and the standard deviation of the mean for a given group of determinations. This procedure will also serve as a check on the technics being used.

If metacryotic fluid has separated from the samples during storage, its presence should be noted and an estimate made of the amount by weighing the package containing the sample before and after the removal of the sample.

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Plant Program

—*Continued from page 89*

accidents. In nearly six years, only six accidents to personnel have occurred. Of these, three employees required hospital care, with a consequent loss in working time. In nearly three years of the immediate past, only one accident resulted from carelessness by a machine operator. The other accidents resulted from a fall and similar mishaps likely to occur in connection with installation and repair of equipment.

Other phases of the company's employee relations program include:

1. Hospitalization, sick benefits, and life insurance financed by company funds.

2. Two-weeks vacation with pay for those with an employment period of more than one year, and 2 percent of wages received for those with less than one-year employment.

3. A turkey for each employee for Thanksgiving and an annual bonus at Christmas time based on the employee's yearly earnings.

4. Hot and well-balanced noon-time lunches in the company cafeteria at company expense.

5. Morning and afternoon rest periods, with coffee and doughnuts, or equivalent, at company expense.

6. Job security at full-week pay based on guaranteed work-week of 40 hr. The workers stock-pile products during off-season months against heavy shipments during months of heaviest sales. Also, plant maintenance and painting work is stepped up during off-season months to keep employees at work.

The program is good business and non-paternalistic in that the expense of the program to the company is offset by: The reduction in production costs obtained by steady performances of personally interested employees, elimination of spoiled goods, avoidance of lost-time accidents, and improvement in product quality with no increase in cost of ingredient materials and supplies.

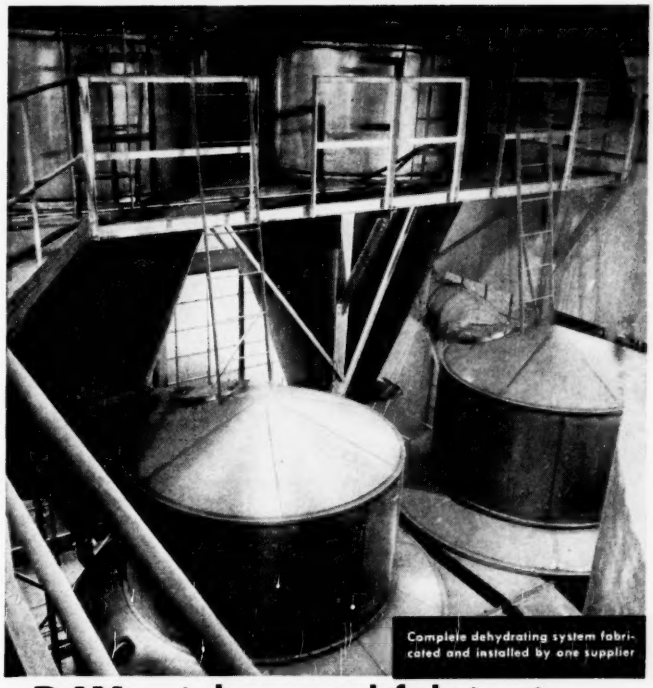
—End—

Improved Bottle Washing

—*Continued from page 86*

production. Moreover, the foam of these solutions tends to break up upon continued agitation and use. Some foaming occurs when this agent is added to bottle-washing solutions, but this is not objectionable in soaker-type machines.

Hydro-type machines which spray the solution into the bottles will foam



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more, and some inconvenience may be occasioned by freshly prepared solutions. The efficiency of the solution is not hampered by this foaming. Continued use for a few hours at most will cause the foaming to subside.

Methods of Use

Optimum results from these wetting agents are obtained when the surface tension of the soaker solution is maintained at less than 35 dynes per cm. However, this is a tedious and relatively rare determination for routine control.

Any type of alkali may be used with a wetting agent, although the less expensive ones are the most economical. In preparing a new solution, 3 lb. of the wetting agent should be added for each 100 lb. of alkali employed. It may be either added directly to the solution or dissolved first in water. If added in the dry form, it should be scattered on the surface to facilitate rapid solution as the machine runs.

If the machine has several soaking compartments, the agent should be added to each that received a charge of alkali—always adding 3 percent of the agent based on weight of alkali used.

Daily additions of make-up alkali should be accompanied by the wetting agent in the same 3 percent ratio. If 25 lb. of caustic is added, ¾ lb. of agent (or 12 oz.) would be put in at the same time.

Purity of Compound

At least two manufacturers are producing the alkyl aryl sulphonate type of wetting agents. Several forms are available, varying from powders through flakes to liquids. Beside the differences in physical form, they may differ in the nature of the hydrocarbon side-chain and in the cation forming the salt.

The salt-free and odorless preparations, while effective, are considered less economical to use than those which are produced as technical grades in the form of sodium salts of benzene sulphonic acid carrying a hydrocarbon side-chain consisting of at least twelve carbon atoms.

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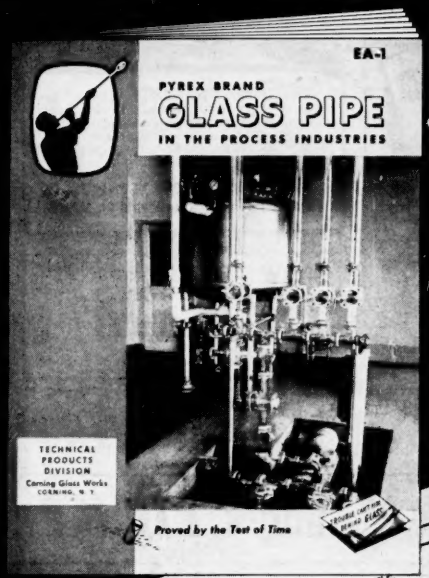

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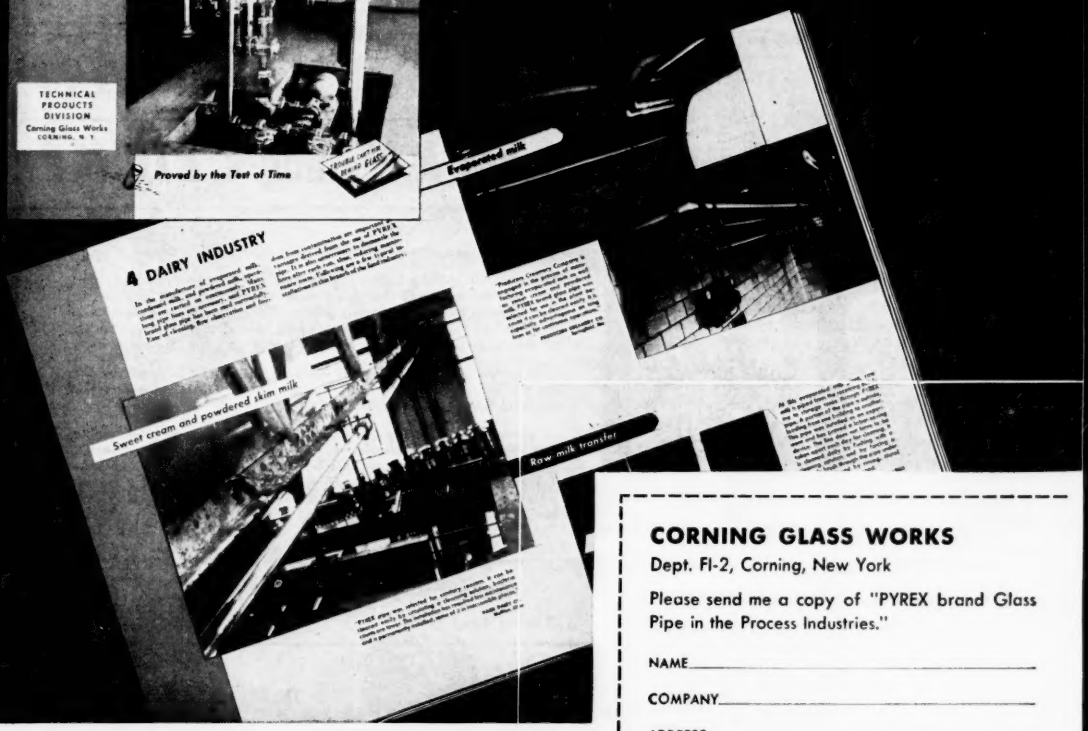

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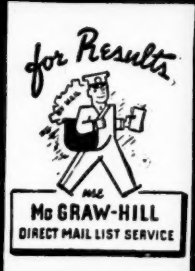

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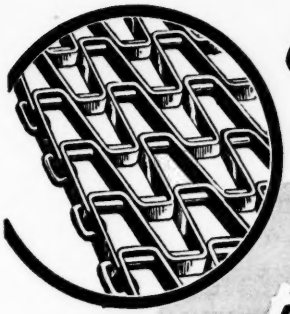

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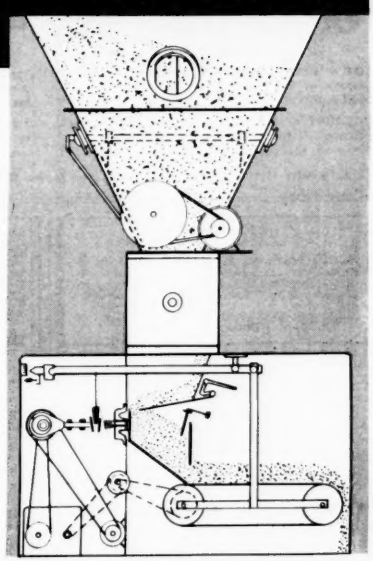

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(Continued on page 222)

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1—J. H. Day 6 barrel "Hercules" tilting type mixer with A. C. motors.
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1—#10 Sweetland 2" centers, iron or copper leaves
1—#5 Sweetland 2" centers, copper leaves
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2—8 x 12 Oliver all steel
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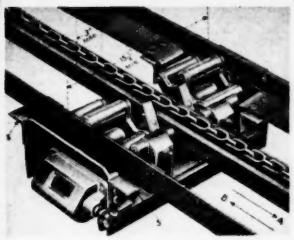

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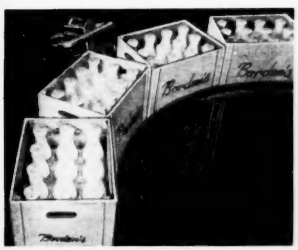

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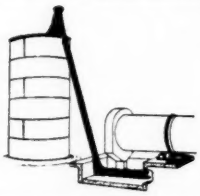

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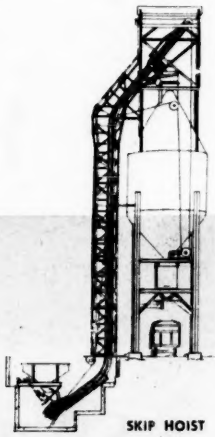

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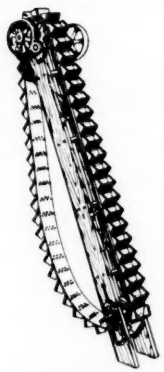

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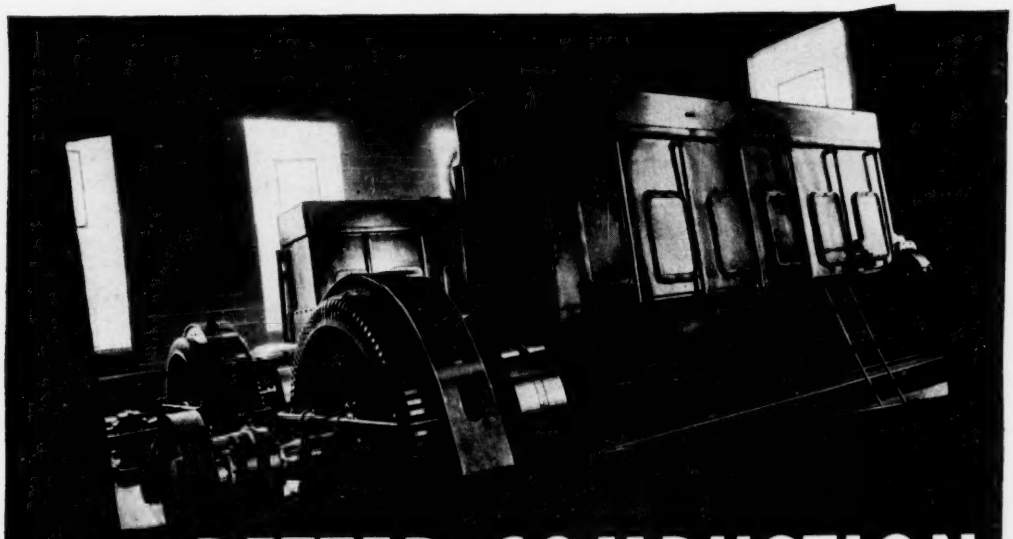

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